FAA-STD-028B

NOTICE

U.S. Department of Transportation
Federal Aviation Administration

N 3000.65

5/1/93

Cancellation
Date: 5/1/94

SUBJ: Contract Training Programs

1. PURPOSE. This notice transmits FAA-STD-028B, Contract Training Programs, as the official standard for contractors who develop and deliver training for the Federal Aviation Administration (FAA).

2. DISTRIBUTION. This notice is distributed to the branch level in Washington headquarters, regions, and centers, with limited distribution to field offices and facilities.

3. BACKGROUND. FAA-STD-028B replaces FAA-STD-028, issued March 28, 1985, and FAA-STD-028A (draft) circulated in 1988. The newly revised standard is being issued to strengthen the Instructional Systems Design (ISD) guidelines, to provide additional training Data Item Descriptions (DID's), and to support the acquisition of computer-based training technologies including courseware for training devices.

4. APPENDICES. Appendix 1 provides further explanation of the revisions that are reflected in FAA-STD-028B. Appendix 2 contains a copy of the revised standard.

5. ACTION. During the effective period of this notice, comments and recommendations for revision of FAA-STD-028B are requested from its users. Please provide written recommendations for improvement by July 30, 1993, to AHT-10. For further information, contact FTS (202) 366-6993.

Joseph P. Kisicki
Director, Office of Training
and Higher Education, AHT-1

Distribution: A-WXYZ-3; A-FOF-0 (LTD)

Initiated By: AHT-1

APPENDIX 1. EXPLANATION OF CHANGES IN FAA-STD-028B

1. **PURPOSE.** FAA-STD-028 and FAA-STD-028A (draft) have been revised based on the lessons learned during the acquisition of contractor-developed training materials and courses. The result is FAA-STD-028B. This standard has been strengthened to support the requirements of the FAA training communities during the review of contract training deliverables. Listed below are the major changes reflected in FAA-STD-028B.

2. **FRONT MATTER.** The front matter has been revised as follows:

a. **Reorganization of the front matter chapters.** This sequence begins with the "Introduction, Procurement and Administration" chapters. It is followed by the "Overview of the Systematic Training Development Process" and the specific chapters on each of the five phases of that process.

b. **Amplification of information** on the types of training conferences that are generally held for a training contract. These are post award conferences, technical interchange meetings, and in-progress reviews.

c. **Specification of the roles of FAA personnel** who support contractor-developed training, to include instructional systems design specialists.

d. **Specification of the requirements for training materials** developed according to "best commercial practice." When best commercial practice is permitted by a program office, this approach will not be used to shortcut a systems approach to training development. Best commercial practice will provide flexibility in format, not content. All formats will be approved by the FAA prior to use. In addition, traceability to tasks selected for training will be required.

e. **Strengthening and clarification of instructional systems design requirements:**

(1) **Development of training outcomes** during the design phase rather than the analysis phase.

(2) **Changes in terminology** from "instructional" and "lesson" objectives to "terminal" and "enabling" objectives.

(3) **Specification of training outcomes** at the duty level, of terminal objectives at the task level, and of enabling objectives at the subtask level.

(4) Specification of terminal objectives as job performance behaviors rather than training behaviors.

(5) Addition of the requirement for traceability of duties and tasks selected for training to training outcomes and terminal objectives, respectively.

3. DATA ITEM DESCRIPTIONS (DID's). Revisions have been made to existing DID's and new DID's have been added as follows:

a. The Task and Skills Analysis DID has been revised to define job performance requirements more accurately and to provide thorough documentation that is directly related to the job. In addition, the DID was broadened to accommodate management as well as technical training analyses. Finally, the category of task "elements" was added to the task hierarchy so that specific data may be obtained for analyses that are conducted in support of computer human interface (CHI) training. Specification of task analysis data at the element level is optional.

b. A Cognitive Analysis DID has been developed as a follow-on to task analyses which indicate that specific tasks have strong cognitive components. These types of tasks would require the performer to exercise judgment, solve problems, and make decisions. While a task analysis provides procedural information on job performance, a cognitive analysis will provide a systematic means of determining the cognitive processes and strategies that support job performance.

c. A Job Aids DID has been developed for the design of instructional tools that provide information on the steps in a procedure or that guide the user in making decisions related to a specific job task. Examples of job aids are checklists, procedural lists, flow charts, and illustrations.

d. A series of DID's have been developed for computer-based instruction and video disc courseware. This series includes the following DID's: Lesson Specifications, CBI Testing, Validation Plan and Report, Video Treatments, Storyboards and Scripts, Video Shot List, and CBI Program Documentation.

e. A DID has been developed to support interactive courseware for training devices. This DID documents the requirements for deliverables that are developed as part of the interactive courseware for a training device. The DID is applicable to computer-aided as well as computer-based courseware.

f. A DID has been developed for Video Courseware. This DID documents the information that the FAA needs to evaluate a contractor's decisions concerning the content, treatment, and organization of video courseware.

g. A DID has been developed for Developmental Tryouts of course materials. This DID provides the minimum requirements for developmental tryouts that are conducted to assess the effectiveness of materials when they are in a semi-finished or draft form. The materials are presented to representatives of the target population, in a training environment, for their use and comment.

h. Existing DID's have been strengthened consistent with the additional guidelines for instructional systems design that have been added to the front matter of the standard. One example is the requirement for traceability among training outcomes, learning objectives, and task analysis data in the Course Design Guide.

i. A requirement has been added to the Lesson Plan DID for establishing a bridge between management and technical processes and procedures, as currently performed and how they will be performed in the future as the result of new equipment or workforce changes. This requirement will apply when supplemental training is being developed. The sample lesson plan format was also revised to provide additional guidance on the type of information that should be included in each section.

j. In the Student Achievement Test DID increased emphasis has been placed on the need for performance checklists when hands-on performance is required.

k. A requirement has been added to the Commercial Off-the-Shelf (COTS) Report DID for FAA copyrights to COTS materials.

FAA STANDARD 028B

CONTRACT TRAINING PROGRAMS

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

May 1, 1993

DISTRIBUTION: A-WXYZ-3; A-FOF-0 (LTD) **INITIATED BY:** **AHT-1**

FOREWORD

This standard replaces FAA-STD-028, issued on March 28, 1985, and FAA-STD-028A (draft), circulated in 1988. This standard contains specifications for contractors who analyze, design, develop, deliver, and evaluate training for the Federal Aviation Administration (FAA).

The application of the principles and practices of a systematic training development process, such as Instructional Systems Design (ISD), and the use of a job-centered training approach are the FAA's greatest assurances that quality training products will be submitted by contractors to the FAA. The products, required by this standard, provide evidence to the FAA that a contractor is applying the principles and practices of a systematic process for developing training.

Chapters 1 through 9 of this standard provide guidance for training development and delivery by a contractor. The Data Item Descriptions (DID's) in Appendix 1 specify the format, content, and procedures for products submitted to the FAA for review and approval.

Recommendations, additions, deletions, and other pertinent information which would improve this standard should be addressed to the Strategic Planning, Policy, and Budget Staff, AHT-10, Federal Aviation Administration, 400 Seventh Street, S.W., Washington, D.C. 20591.

Joseph P. Kisicki
Director, Office of Training
and Higher Education

APPENDICES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION

1-1. Purpose. This standard establishes procedures for contractor developed and/or delivered training through the application of the principles and procedures of a systematic training development process. Order 3000.6C, Training, governs the application of this standard. This standard shall be applied to all training procurements. Deliverables shall be developed as specified in the DID's and shall be delivered in accordance with the contract.

1-2. Distribution. This standard is distributed to the branch level in FAA headquarters, regions, and centers, with limited distribution to all field offices and facilities.

1-3. Cancellation. FAA-STD-028, issued March 28, 1985, is canceled. FAA-STD-028A (draft), circulated in 1988, is superseded by this standard.

1-4. Background. FAA training, developed and delivered by contractors, has increased significantly since the first standard, FAA-STD-028, for contractor training programs was issued in 1985. Faced with increased responsibilities for procuring, monitoring, reviewing, and approving contractor training deliverables, the FAA is strengthening the specifications for its contractor training deliverables by issuing a revised standard, FAA-STD-028B.

1-5. Systematic Development Process. The application of the principles and practices of a systematic development process and the use of a job-centered training approach are the FAA's greatest assurances that quality training deliverables will be submitted by a contractor to the FAA. The deliverables, required by this standard, provide evidence to the FAA that a contractor is applying the principles and practices of a systematic training development process.

1-6. Explanation of Changes. This standard has been revised to accomplish the following:

a. Strengthen the specifications stated in the DIDs.

b. Ensure traceability between job tasks and training objectives and materials.

c. Develop a more rigorous review and approval process to ensure accountability.

d. Provide Data Item Descriptions (DIDs) for development of computer-based instruction (CBI).

e. Incorporate the best available examples of deliverables.

f. Ensure consistency between this standard and the agency's policy for training, Order 3000.6C.

1-7. **Definitions**. Definitions for the terms used in this standard are provided in the glossary, located in Appendix 2. A list of acronyms used in this standard is located in Appendix 3.

1-8. **Requests for Information**. Further information or clarification about this standard is available from the Office of Training and Higher Education (AHT-10), Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591.

1-9. **Application of This Standard**. When conflict exists between the requirements of this standard and its referenced documents, this standard shall take precedence. Where the requirements of the Government Printing Office Style Manual conflict with the requirements specified in this standard, the requirements of this standard shall take precedence. Questions concerning the application of this standard to a specific contract shall be directed to the appropriate FAA Contracting Officer's Technical Representative (COTR).

CHAPTER 2. PROCUREMENT

2-1. Purpose. This chapter discusses the procurement phase and its relationship to the phases of the systematic development process.

2-2. Description of the Procurement Phase.

a. Changes in Job Requirements. Changes in job requirements, which may necessitate a change in training requirements, may result from:

(1) Installation of new technology.

(2) New versions of equipment already in use in the FAA.

(3) Workforce expansion.

(4) Improved workforce proficiency.

b. When the program office responsible for a change releases a procurement request (PR), training is requested to support the change. The program office, in accordance with the latest edition of Order 4400.4, Guide for Preparing Procurement Requests, coordinates training requirements and specifications with the appropriate AHT division and service organization. Contractors respond with their proposed solutions in a technical proposal, which follows the guidelines in DID-1.

2-3. Critical Actions. Activities during this phase focus primarily on the management of the proposed training course. During procurement the:

a. Bidding contractors propose the development and delivery of training in accordance with the specifications stated in the solicitation and in DID-1, the Contractor's Proposal for Training.

b. Contract is awarded to the training contractor who is likely to provide the most cost effective training and the most qualified personnel.

c. Schedule for submission and review of the deliverables is prepared following contract award, as specified in the contract.

2-4. Documentation. The deliverables associated with the training procurement phase include the:

a. Contractor's Proposal for Training (DID-1)

b. Milestone Chart (DID-2)

c. Personnel Qualifications Report (DID-3)

2-5. DID-1 Contractor's Proposal for Training. DID-1, the Contractor's Proposal for Training, provides contractors with guidance about the preparation and inclusions for their proposal for training. DID-1 also serves to provide guidance to the FAA, specifically for writers of the specifications for the bid and for members of the FAA proposal evaluation team.

a. Training Staff. DID-1 requires a description of the training staff and their skills for the proposed training. It should be emphasized that the selection and use of appropriately qualified personnel is critical to the development of effective training. Each individual must bring special skills to the task to design, develop and deliver effective training. The categories of personnel are:

(1) Instructional Systems Design (ISD) personnel, both for the government and for the contractor who manage the effort, plan the strategies and are responsible for the final product.

(2) Subject Matter Experts (SMEs), who are responsible for lesson content and work with the ISD team.

(3) Instructional developer, who is responsible for developing and documenting the lesson content and sequence as specified by the designer and the SME.

(4) Computer-based instruction (CBI) programmer who takes CBI materials developed by the ISD team and programs the CBI lessons.

(5) Instructor, who delivers the instruction and must possess a wide variety of teaching, counseling, evaluation, and adult learning skills.

b. Commercial Off-The-Shelf Training Materials. When commercial off-the-shelf training materials (COTS) are proposed, the contractor shall provide the information required by the Commercial Off-the-shelf Training Materials Report (DID-12) and submit the proposed materials for FAA assessment.

c. Best Commercial Practice. When training materials are to be developed according to "best commercial practice," the following requirements shall be met:

1) A systems approach to training development shall be used.

2) Traceability between the task analysis data and the course design guide shall be provided. Terminal objectives shall be traceable to tasks selected for training.

3) Best commercial practice shall provide flexibility from the standpoint of format, not content. It shall not be used to shortcut the application of instructional systems design processes and procedures.

4) Formats for best commercial practice shall be submitted to the FAA COTR for review and approval prior to use.

2-6. Contract Award. The FAA awards the contract after reviewing each contractor's proposal for training.

2-7. DID-2 Milestone Chart. DID-2, Milestone Chart, specifies the format and items to be included in a timeline for the development and delivery of the course(s). Although such information is provided in the contract, a Gantt-like chart format is extremely useful as a management tool for the FAA COTR and other FAA personnel involved with the review of the deliverables. The milestone chart is updated to reflect changes to the delivery schedule which are authorized by the FAA Contracting Officer. Within 10 days of the approved change, the contractor is required to submit the milestone chart indicating the appropriate revision(s).

2-8. DID-3 Personnel Qualifications Report. DID-3, Personnel Qualifications Report, provides the requirements to be addressed in the report for all contractor personnel assigned to training development and delivery tasks. A resume for each individual identified in the report is required for approval by the FAA. The FAA reserves the right to approve changes in key personnel for training development and delivery.

CHAPTER 3. ADMINISTRATION

3-1. Purpose. The purpose of this chapter is to provide guidance about logistical aspects pertinent to training delivery.

3-2. Accident Prevention. Safety precautions and an awareness of accident prevention are prime considerations in all training activities. Any instruction developed for the FAA by a contractor using this standard shall emphasize each person's accident prevention responsibilities, both as an individual and as a representative of the FAA.

3-3. Copyrighted Material. All material required by this standard shall be free from all encumbrances which prohibit their reproduction or use by the FAA for training purposes. This includes, but is not limited to, copyrighted, registered documentation and software. All material developed for the FAA contractors shall be the sole property of the FAA and shall not be used by the contractor for any purpose other than those in the contract.

3-4. Classroom, Laboratory, and Shop Facilities. Classroom,laboratory, and shop facilities are subject to inspection and approval by the FAA Contracting Officer, or designee, either before or during the contract period. The contractor shall correct any deficiencies identified before the start of training. If training is already in progress, the deficiencies shall be corrected within 10 days, or within the time period specified by the FAA Contracting Officer.

a. Space. Not less than 30 square feet gross per student shall be provided.

b. Lighting. Lighting shall not be less than 50 foot candles on the surface of the student's desk. If computer terminals are used, classroom lighting shall be variable by means of appropriate lighting controls.

c. Noise. Ambient, unoccupied room level noise, as measured with a General Radio Company Permissible Sound Level Meter Type 1565B, or equivalent, shall not exceed 40 dBa at any point in the classroom or 70 dBa in laboratory environment under the following conditions: all equipment and room doors closed, covers on, and equipment in operation.

d. Heating and Cooling. Temperature levels shall be adjustable within an ambient temperature range of 70 degrees F (21 degrees C) and 75 degrees F (24 degrees C) for classroom and laboratory facilities.

e. Safety. The training environment and facilities shall comply with all standards established by the National Electrical Code, National Fire Code, United States of America's Standards Institute and United States Government Occupational Safety and Health Administration.

f. Cleaning. As a minimum, the contractor shall provide the following janitorial services if facilities are not Government furnished:

(1) Daily

(a) Clean chalkboards.
(b) Clean student desk tops.
(c) Empty wastebaskets.

(2) Weekly

(a) Sweep floors.
(b) Dust all room furniture and equipment.

(3) Monthly

(a) Mop or vacuum floor as appropriate.

g. Furniture. Students shall be seated at desks, tables, or provided with a proper rest on the side of the chair for writing or taking notes. Sufficient storage space shall be provided in the vicinity of the student's desk to store training manuals and other course related material. If computer terminals are to be used, they shall be placed to make viewing and keyboard entries convenient and non-fatiguing.

h. Training Aids. Training aids such as chalkboards, overhead projectors, slide projectors, and audiovisuals shall be provided as required in the training documentation.

i. Sanitary Facilities. Sanitary, separate restroom facilities for men and women shall be available within convenient distance of classroom or laboratory. Restroom facilities shall be provided for handicapped persons.

3-5. Housing, Dining, and Transportation Facilities. The contractor shall not be responsible for housing, dining facilities, or transportation. However, for training courses conducted at other than Government facilities, the contractor shall provide directions to the training facility and a list of housing, dining, and transportation facilities available in the vicinity of the training facility. This information shall be

provided to the FAA COTR at least six weeks prior to the scheduled first class of the course.

3-6. **Course Schedule**. Course schedules shall be prepared in accordance with DID-6. Training shall be scheduled for eight hours per day for five work days per week, unless otherwise specified by the FAA Contracting Officer. Federal holidays shall not be class days and shall not be absorbed in the overall course length.

a. Length of Instruction. Class instruction periods for lecture/demonstration shall normally be 50 minutes duration with a 10-minute break between periods of instruction. Length of practical application periods may vary as the situation requires.

b. Accelerated Training. To meet urgent requirements, the acquiring activity may direct a second shift or accelerated training where circumstances and availability of system or equipment so dictate. The daily schedule of the training course(s) shall be conducted so as to allow optimum utilization of the system or equipment by the using FAA activity.

3-7. **Student Reporting**. The students shall be directed to report to a designated individual at the training facility. The names of students authorized to attend the training course shall be provided to the contractor prior to the first day of the course. The contractor shall ensure that only personnel designated by the FAA attend and participate in training programs procured under the provisions of this standard. If a student who is authorized to attend the training course fails to arrive on the first day of the course or any day thereafter, the contractor shall immediately notify the FAA COTR.

3-8. **Student-to-Instructor Ratio**. The student-instructor ratio shall be no greater than 16 to 1 in the theoretical phase of the course and no greater than 4 to 1 in the practical application phase. Deviations may be waived with prior written approval from the FAA Contracting Officer.

3-9. **FAA System or Equipment Availability**. If training is conducted at a FAA field site, the system or equipment to be used in the training course(s) at the FAA site shall be available to the contractor for a minimum of four hours per day. If a conflict arises with the FAA site's daily schedule, the system or equipment shall be available for training after 8:00 PM local time, Monday through Friday.

3-10. **Training Equipment and Material**. Any contract for the delivery of training services shall state whether training equipment is contractor furnished or Government furnished. Any

information for private purposes which is not available to the general public.

CHAPTER 4. AN OVERVIEW OF THE SYSTEMATIC TRAINING DEVELOPMENT PROCESS

4-1. Purpose. This chapter provides an overview of the events that occur during a contractor's development and delivery of training for the FAA.

4-2. Phases. Prior to the start of the systematic development process, the FAA specifies the training deliverables to be developed and submitted by a contractor. The deliverables provide evidence of the application of the principles and procedures of a systematic development process. This process consists of the five phases of analysis, design, development, delivery, and evaluation. Each phase has specific deliverables and critical decisions associated with it.

4-3. Training Development Process for Contractor Developed Training. Figure 4-1 illustrates the relationship of the phases, the associated DIDs, deliverables, and review points which occur during the development and delivery process.

4-4. Review and Approval Process. Figure 4-2 depicts the stages of contractor developed training deliverables. For each training deliverable specified in a contract, the contractor submits a draft to the FAA for review. Following the review, the contractor incorporates the FAA's comments into the deliverable and submits it as a revised draft. The contractor shall include change bars in revised deliverables to indicate where information has been modified or deleted. The change bars shall be removed from all camera-ready final deliverables that have been approved by the government. The contractor shall revise the deliverable if the FAA considers it inadequate and/or inconsistent with the comments received during the FAA review.

a. Revised Draft Approval. The FAA's approval of the revised draft signifies an acceptance of the deliverable for subsequent development and validation activities, and authorizes the contractor to proceed with development of the next deliverable(s).

b. Final Deliverable. Following validation of the course, the contractor submits a final version of the deliverable(s), reflecting the comments from the first course conduct. The contractor furnishes the final deliverable(s) in the format specified in the contract. Final format takes one of two forms: camera ready copy or master reproducible.

4-5. Deliverable Specifications. Deliverables, submitted as documents, shall be provided: (1) on 8 1/2 by 11 inch bond paper

with the page number at the bottom of each page and the date of submission, and (2) on electronic media, i.e., compatible disks. All deliverables submitted by the contractor shall be free of errors in punctuation, spelling, and grammar. All instructional materials, unless otherwise specified, shall be identified with numbers/labels that are consistent with the identification system of the FAA organization for which the training is developed.

4-6. FAA/Contractor Conferences. There are three types of conferences that will be held during the course of a contract for training development and/or delivery: a post award conference, technical interchange meetings, and in-progress reviews. The contractor shall prepare agendas for the technical interchange meetings and in-progress reviews. Minutes of these two types of meetings shall be prepared by the contractor and submitted to the FAA COTR for concurrence.

a. Post Award Conference. No later than 30 days after the award of a training contract (or exercise of a training option of a contract), a post-award conference shall be convened by the FAA Contracting Officer who shall serve as chairperson and designate the location for the conference. The conference shall:

1) Establish a liaison between the contractor, FAA Contracting Officer, FAA Technical Officer, FAA COTR, and other FAA personnel specified in the contract and charged with the responsibility for contract administration.

2) Permit inspection of the contractor's facility and establish a working relationship with contractor personnel.

3) Discuss the proposed course development methods and the requirements associated with each deliverable required from the contractor.

4) Review the milestone chart for the training effort.

b. Technical Interchange Meetings (TIM's). TIM's are formal checkpoints and opportunities to share information between the contractor and the government. TIM's may occur at any point in the training development process.

c. In-Progress Reviews (IPR's). IPR's are formal presentations by the contractor to the government concerning the progress that has been made on the training development or delivery effort to date. The frequency and scheduling of IPR's will be stated in the contract.

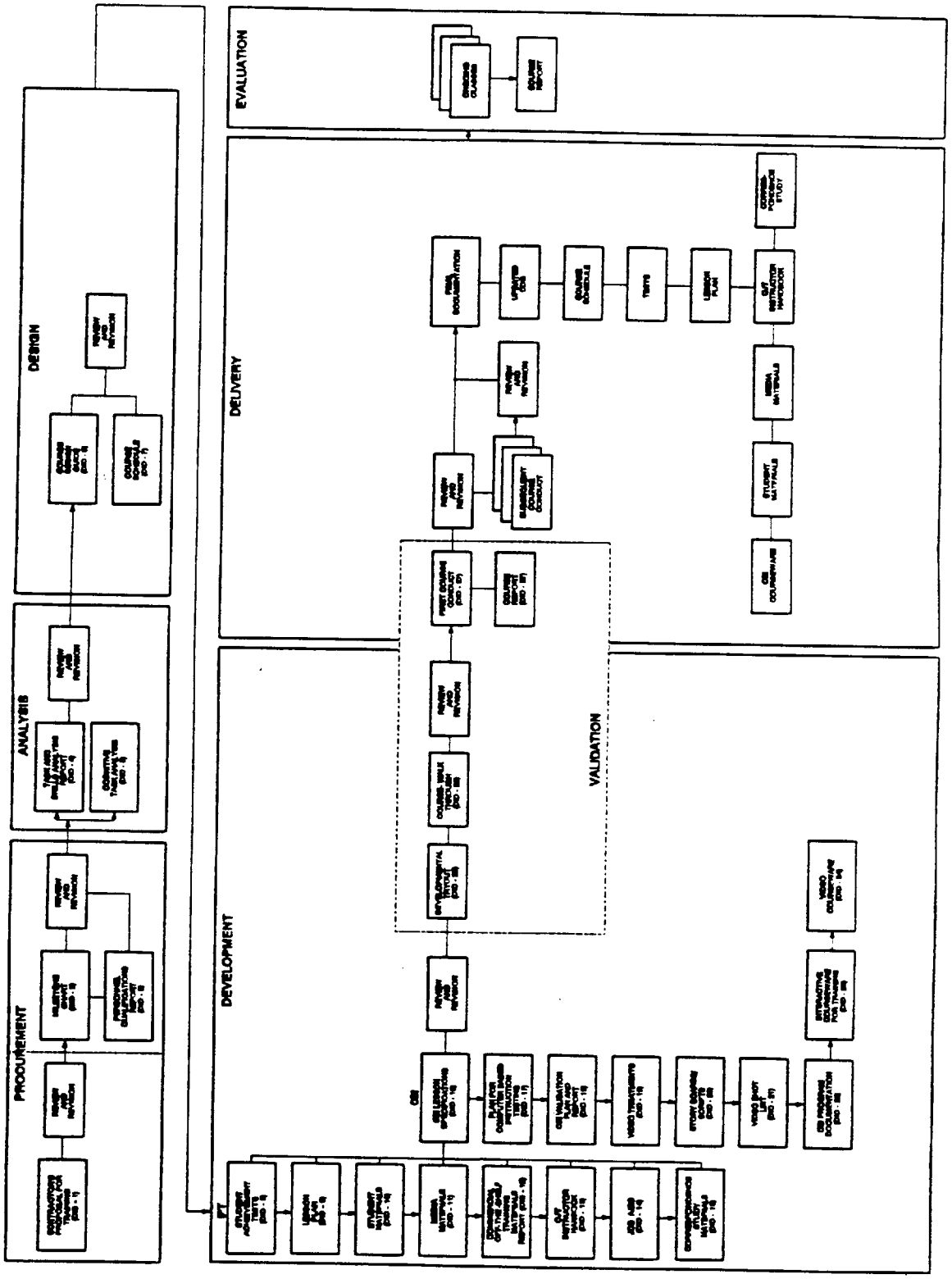


FIGURE 4-1. SYSTEMATIC PROCESS FOR CONTRACTOR DEVELOPED TRAINING

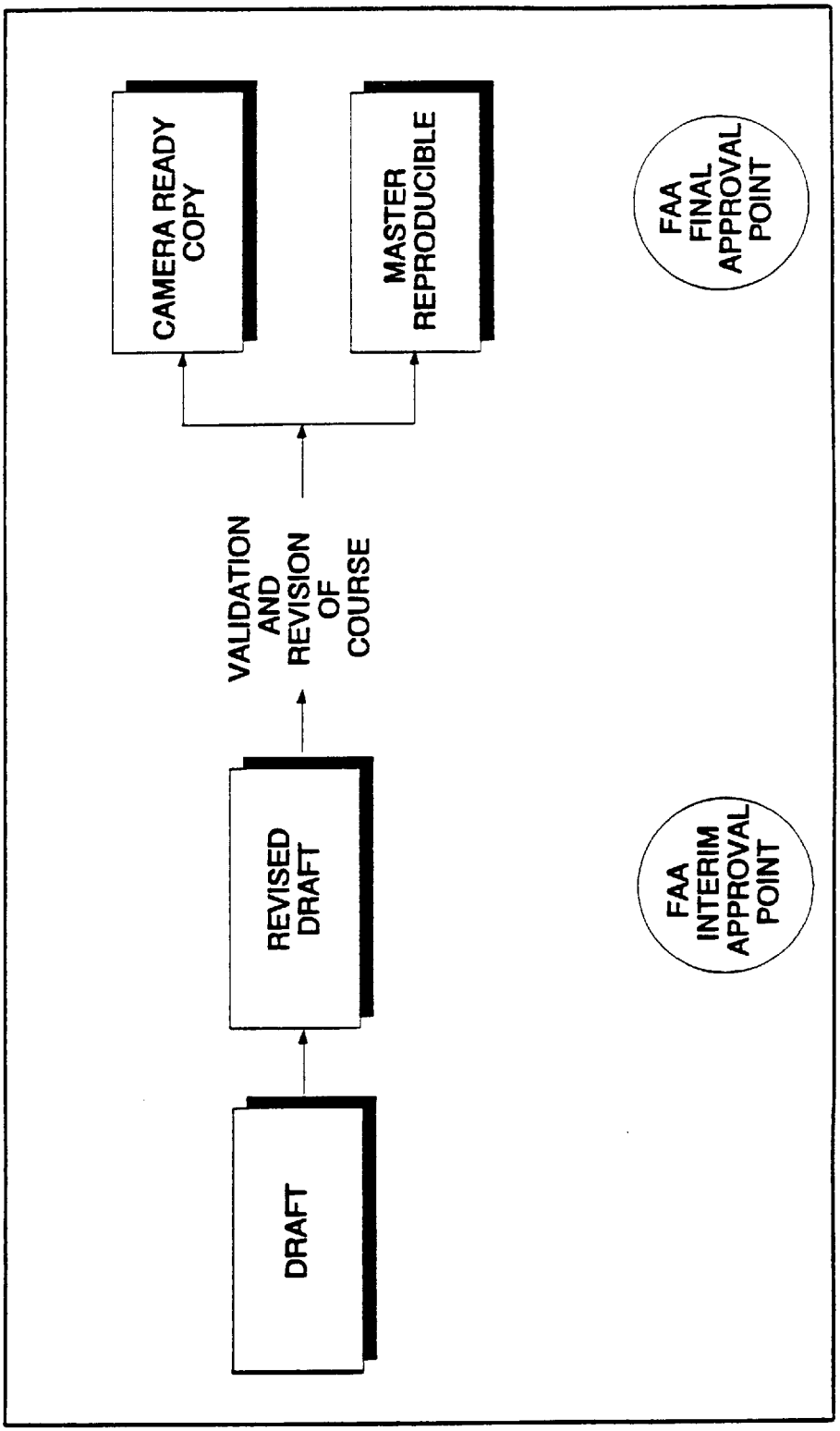


FIGURE 4-2. REVIEW AND REVISION OF CONTRACTOR DEVELOPED TRAINING DELIVERABLES

4-7. Roles of FAA Personnel. The FAA personnel, typically involved in contractor developed training, and their roles are described below.

a. Contracting Officer. The FAA Contracting Officer provides contractual approval of deliverables and authorizes modifications to the contract.

b. Technical Officer. The FAA Technical Officer provides special expertise and advises on the technical aspects of the contract.

c. Contracting Officer's Technical Representative (COTR). The FAA COTR provides technical training oversight of the contractor's efforts and is a designee of the FAA Contracting Officer. An FAA COTR is assigned for each line item in the contract.

d. Instructional Systems Design (ISD) Specialist. This FAA specialist provides guidance on the application of ISD processes and procedures in accordance with FAA-STD-028B.

CHAPTER 5. ANALYSIS

5-1. Purpose. This chapter discusses the analysis phase of the systematic development process. Analysis is the foundation for all desired training outcomes. Analysis determines the tasks that require training and the characteristics of each task. The analysis is used in the design phase to determine the most effective manner of training employees to achieve the desired job performances.

5-2. Description of the Analysis Phase. The analysis phase includes the determination of job performance requirements. The job performance requirements are the tasks which a person must perform, the conditions under which these tasks must be accomplished, and the standards of performance.

5-3. Critical Actions. During the analysis phase the following items are determined:

a. Desired job performance

b. Tasks and subtasks that make up the job performance

c. Conditions, standards, knowledge, and skills required for successful performance of each task

d. Tasks which require training

5-4. Documentation. The determinations made in the analysis phase are documented in:

a. The task and skills analysis which is described in the Task and Skills Analysis Report (DID-4).

b. The deliverables associated with a cognitive task analysis which is described in the Cognitive Task Analysis (DID-5). These deliverables are:

(1) The cognitive analysis plan

(2) The preliminary cognitive analysis data

(3) The cognitive analysis report

5-5. DID-4 Task and Skills Analysis Report. A task analysis is conducted when job task(s) change due to the introduction of a new piece of equipment or technology, or when there is a change in some part of a system or workforce requirements. A task and

skills analysis provides specific information about job performances which is needed for the design and development of quality training. A task analysis should be updated to incorporate current job information.

5-6. **Hierarchy**. A task analysis results in a hierarchy that depicts the relationship of the various levels of a job performance. The most comprehensive level of the hierarchy is the job. The job is divided into duties. Each duty consists of tasks which are further divided into subtasks. The hierarchical levels of a task analysis are depicted in Figure 5-1. The figure uses the numerical labels specified in DID-4, Task and Skills Analysis report.

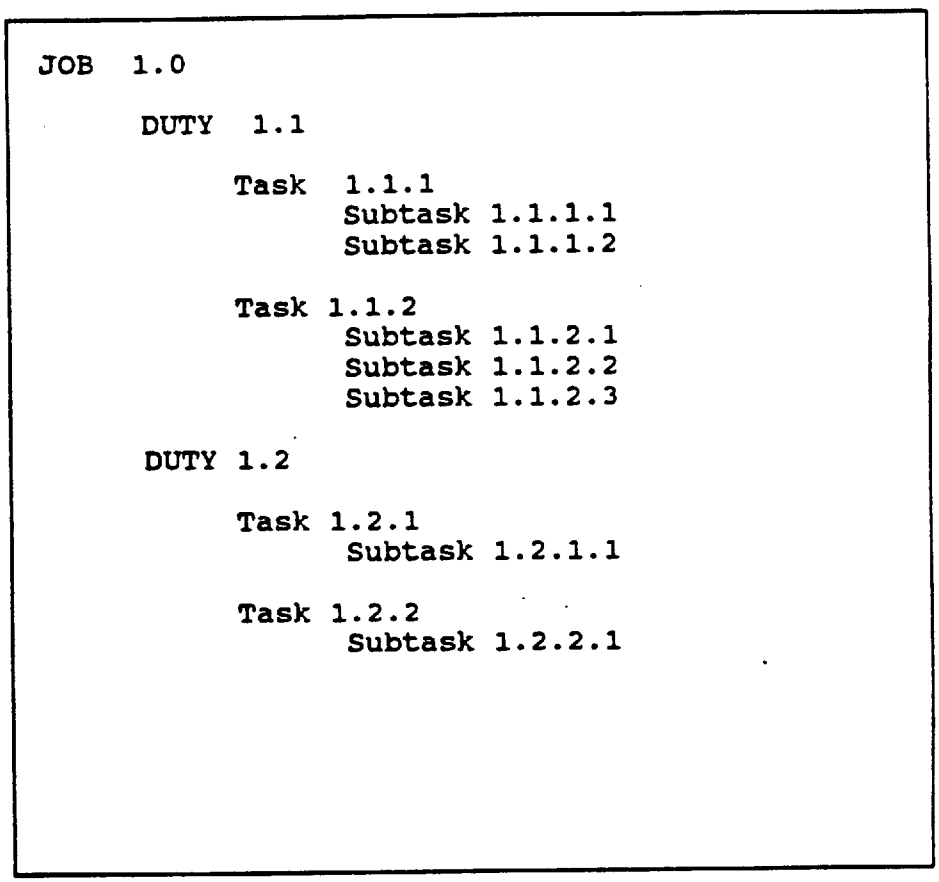


FIGURE 5-1. LEVELS OF A TASK ANALYSIS HIERARCHY

5-7. Task and Subtask Characteristics. DID-4 requires that, at a minimum, the following characteristics of a task (and its associated subtasks) must be observed, documented, and analyzed:

a. Criticality. Tasks have varying degrees of importance in job performance. Some tasks are vital to job performance while others may be of lesser consequence. Task criticality is rated according to the consequences for inadequate performance (for example, injury to personnel, major functions are not accomplished, damage to equipment). Criticality ratings ensure that tasks essential to safe and successful job performance are identified for training.

b. Frequency. Frequency refers to how often a task and subtask are performed. Frequency shall be coded as follows: continuous activity (CA), hourly (H), daily (D), weekly (W), monthly (M), and as required (AR).

c. Difficulty. Difficulty refers to the mental and physical effort required by an employee to master task performance. Rating the difficulty of a task requires considering the typical situations involved in performing the task, rather than unusual circumstances or locations rarely encountered on the job. In judging task difficulty, two major factors should be considered: cognitive activities and motor coordination.

(1) Cognitive activities include:

(a) Retention and recall (for example, remembering the correct sequence of procedures for completing a task).

(b) Recognition, evaluation, comprehension, and understanding (for example, understanding the effect on a system of closing a specific valve).

(c) Problem solving (for example, determining the cause of an equipment malfunction).

(2) Motor coordination includes:

(a) Gross motor coordination (for example, entering data manually while communicating orally).

(b) Fine manual dexterity (for example, calibrating an instrument).

(c) Performing tasks under restricted conditions (for example, while wearing bulky clothing).

d. New or Old Task. Identifying new and old tasks contributes to the overall train/no train decision for a task. If a task is old, job incumbents are probably familiar with the task because they have been performing it on the job. If any portion of a task is new then the entire task needs training.

e. Initiating Cues, Conditions, and Standards. Identifying initiating cues and conditions for each task contributes to the full description of the task. Cues are the indicators that the task is to be performed. Conditions are the "givens" for task performance. The identification of performance standards for each task supplies the foundation for the development of criteria for determining whether or not the task has been adequately trained.

f. Knowledge and Skills. Identifying the knowledge and skills necessary for the performance of each task contributes to decisions as to the instructional methods and media which should be used.

g. Team or Individual Task Performance. Each task should be analyzed to determine if it is performed by an individual or a team. This differentiation will impact the way the task will be trained.

h. Time to Perform. Identifying the length of time personnel take to perform a task contributes to the development of criteria for determining whether or not the task has been adequately trained.

5-8. Validation of the Train/No Train Decisions. The contractor recommends a train/no train decision for each specific task, as required by DID-4. These preliminary decisions shall be reviewed by job incumbents, or at a minimum, personnel familiar with the environment in which a set of tasks are performed, to assess the technical aspects of the train/no train decisions. These preliminary decisions become final only when the FAA COTR approves the deliverable.

a. Flowcharting. A flowchart is a visual roadmap of a task. It is a graphic way of sequencing the steps and decisions that go into performing a task. A flowchart of a job task is a map of what the person does on the job, not a map of the learning process. Flowcharting is an effective tool for analyzing a task because it:

(1) Reveals complexities in the task.

(2) Provides all the information necessary to perform the task.

(3) Makes it easy to identify the skills needed to perform each step of the task.

(4) Often reveals easier ways to perform a task or exposes unnecessary steps in a task.

Figure 5-2 provides an example of a task analysis flowchart.

b. Flowchart Symbology. Flowcharts use a set of symbols to represent specific occurrences. The simplest symbology consists of two flowchart symbols:

(1)	Start or Stop Box	Indicates the point at which a process starts or stops.
(2)	Action Box	Indicates some specific action, other than a decision, is to be performed at this point in the sequence.
(3)	Decision Diamond	Indicates that some logical decision is to be made, usually a "yes" or "no" alternative.

5-9. Traceability of Tasks to Training Development. The ability to trace task information throughout the training development process is essential for successful training development and for the subsequent revision of training documentation. During the analysis phase the tasks are arranged in a hierarchy where a numerical label is assigned to each task. It is this label and its subsequent elaborations which provide a tracking system for each task. Refer to Figure 5-1 for an example of a task analysis hierarchy. This labeling shall be used in the Course Design Guide to trace tasks to terminal objectives and training outcomes.

5-10. DID-5 Cognitive Task Analysis. This type of analysis is performed when a traditional task analysis yields tasks which have a strong cognitive component, such as those which require the performer to solve problems and make decisions. Examples are air traffic control tasks related to situation monitoring and maintenance tasks related to equipment troubleshooting. DID-5 describes the content and format of cognitive analysis deliverables.

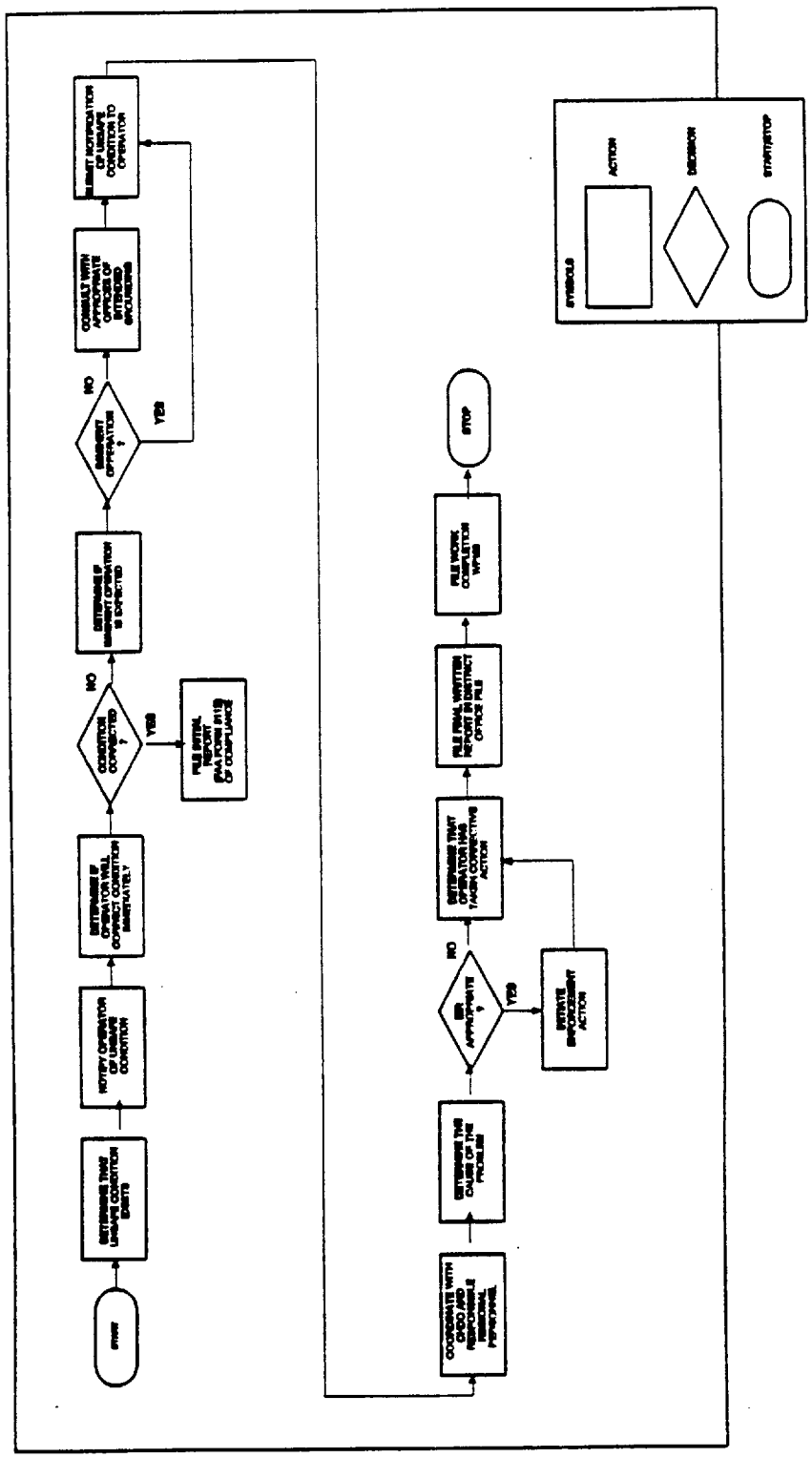


FIGURE 5-2: AN EXAMPLE OF A TASK ANALYSIS FLOWCHART

CHAPTER 6. DESIGN

6-1. Purpose. This chapter discusses the design phase of the systematic development process in which the training course structure is documented. The design phase focuses on the most effective manner in which to train employees to achieve the desired job performance.

6-2. Description of the Design Phase. The purpose of the design phase is to prepare a detailed plan of a training course, based on the information gathered in the analysis phase. In the design phase training outcomes and their associated objectives are developed and sequenced. Instructional methods and media and testing activities are also identified.

6-3. Critical Actions. The design of the training, using information developed during the analysis phase is critical to training development. During the design phase the following are determined:

a. Learning objectives and their sequence.

b. Most effective methods and media for each objective.

c. Appropriate emphasis for each objective, as represented by the amount and type of instructional materials for each objective.

d. Estimated time for accomplishing each objective.

e. Traceability of tasks to the objectives and to the instructional materials.

f. Development of appropriate test design strategies commensurate with the learning objectives.

6-4. Documentation. The determinations made in the design phase are documented in the:

a. Course Design Guide (CDG) (DID-6).

b. Course Schedule (DID-7).

6-5. DID-6 Course Design Guide (CDG). This is a major document in the systematic process for developing effective instruction and in tracking the status of the course during its development. The CDG documents how the learning expected of students will be

accomplished. Training outcomes and objectives for the training are developed, sequenced, and documented in the CDG.

6-6. Training Outcomes. Training outcomes shall be developed for job performances at the duty level of the task and skills analysis. Training outcomes shall consist of three parts: performance, conditions, and standards, and shall be documented in the Course Design Guide.

6-7. Description of Objectives. One or more terminal learning objectives shall be developed for each task selected for training in the tasks and skills analysis (TASA). Terminal learning objectives shall state job performance behaviors rather than training behaviors. Enabling learning objectives shall be written for each terminal learning objective based on the knowledge and skills required to perform each terminal learning objective. This determination shall require an analysis of the subtasks and task elements documented in the TASA which support the task and terminal objective. Enabling learning objectives may be written as training performance behaviors and knowledge items. All learning objectives shall consist of three parts: performance, conditions and standards:

a. Performance. Each learning objective must specify a precise statement that documents what students must do to show that they learned what they were expected to learn. This part of a learning objective is referred to as the performance, or the behavior.

b. Conditions. A properly prepared objective clearly states the limits and/or conditions within which the student is expected to perform. Conditions answer questions such as the following: What does the student have to work with? Must the student select specific tools? Can the student use notes or technical orders for guidance? What information will be provided to the student as a starting point? Examples of conditional statements used in objectives include: "Given an operating Model 1 terminal..."; or "Given a schematic diagram, assorted electrical components, and a dc power source." Conditions may also state the cues that trigger an individual to perform an action.

c. Standards. A third requirement of a good objective is a clearly stated standard of performance. This standard reflects a job requirement. This portion of the objective describes how fast (for example "in 1 hour"), how accurately (for example, "8 out of 10" or "in accordance with Order 7110.65, para. 3-106" or "20 mill separation"), or the actual responses that are considered acceptable performances. Technical manuals, such as the Manufacturer's Instruction Book

(MIB), when used in a standard of performance, should provide a specific reference; for example, "MIB T.I.-8690-1". When a technical manual is referenced in a standard of performance, the technical manual shall be, at a minimum, in draft form and provided with the draft CDG for the FAA review. References to technical manuals and other written documentation shall be stated at the paragraph level, at a minimum.

6-8. Sequencing of Objectives and Content. The objectives establish the framework for the instruction, and show relationships between components of the instruction. Proper sequencing also avoids unnecessary duplication in course content and improves the efficiency of the instruction. One method of sequencing is to use the order in which tasks are performed. This method fosters the transfer of learning from the instructional setting to the job setting. Another method of sequencing is to arrange the instruction in the easiest learning order. This usually means moving from the simple to the complex, from the known to the unknown, or from the concrete to the abstract.

6-9. Hierarchy of Objectives. Levels of objectives are established during the design phase and documented in the CDG. Training outcomes occupy the highest level of the hierarchy in the CDG, followed by terminal objectives and their supporting enabling objectives.

6-10. Methods and Media. The appropriate methods and media for training must be selected. This selection is a critical part of the design process. The choices must be appropriate for the needs of the target population to be trained, the content to be taught, and the resource constraints. Methods and media affect how well the students will be able to learn and to transfer new knowledge and skills to the job.

6-11. Test Type. Identification of the type of tests used to measure the achievement of the objectives is a critical step in preparing the CDG. Tests assess the extent of learning by measuring the behaviors specified in the objectives. Either a written or performance test is identified for each objective stated in the CDG. Consistency shall be maintained between the behavior required in each learning objective and the type of test item selected. For example, learning objectives that require hands-on performance shall require hands-on practice and hands-on test items.

6-12. DID-7 Course Schedule. The course schedule provides the FAA with an overview of the course chronology. It records the contractor's expected schedule for each day of each week of the course in a grid format. Laboratory time, tests, and other

instructional events are included. The course schedule is submitted concurrently with the CDG and shows the major course segments as specified in the CDG. The course schedule is updated throughout the development process. At the course walk-through the detailed course schedule is submitted to the FAA with the lesson presentation.

6-13. Concurrent Submission Process. The FAA requires that the contractor deliver the draft form of the CDG and the course schedule concurrently for FAA review and approval.

CHAPTER 7. DEVELOPMENT

7-1. **Purpose**. This section discusses the development phase of the systematic development process in which the training design is translated into instructional materials. As instructional materials are developed, they are validated through developmental tryouts and a course walk-through to determine their effectiveness in addressing the course objectives and the design specifications. Validation begins in the development stage with the developmental tryouts and course walk-through, and is completed in the delivery stage with the first course conduct.

7-2. **Description of the Development Phase**. In the development phase the instructional materials for the course are developed, validated, and revised. Effective instructional materials are created through the application of learning principles to the learning activities.

7-3. **Critical Actions**. During the development phase the following activities occur:

a. Translation of the instructional design stated in the CDG into effective instructional materials.

b. Creation of consistent and uniform instructional materials which are traceable to previous and subsequent documentation.

c. Revision of the instructional materials based upon the validation activities consisting of the developmental tryout(s) and the course walk-through.

7-4. **Documentation**. The deliverables associated with the development phase include the:

a. Student Achievement Tests (DID-8).

b. Lesson Plan (DID-9).

c. Student Materials (DID-10).

d. Media Materials (DID-11).

e. Commercial Off-the-shelf Training Materials Report (DID-12).

f. On-the-job (OJT) Training Instructor Handbook (DID-13).

g. Job Aids (DID-14).

h. Correspondence Study Materials (DID-15).

i. CBI Lesson Specifications (DID-16).

j. Plan for Computer-Based Instruction Testing (DID-17).

k. CBI Validation Plan and Validation Report (DID-18).

l. Video Treatments (DID-19).

m. Storyboards/Scripts (DID-20).

n. Video Shot List (DID-21).

o. CBI Program Documentation (DID-22).

p. Interactive Courseware for Training Devices (DID-23).

q. Video Courseware (DID-24).

r. Developmental Tryout (DID-25).

s. Course Walk-Through (DID-26).

7-5. DID-8 Student Achievement Tests. This DID specifies the means by which learning performance is measured and reported. The use of written and performance tests is defined, and guidelines for their production are provided.

7-6. Selecting the Appropriate Test Type. For each terminal objective and enabling objective, the appropriate test type must be selected. The test type must be consistent with the type of learning associated with each objective. Written tests measure student knowledge, understanding and ability to apply concepts and principles. Written tests shall be prepared in accordance with FAA-D-2706, Theory of Operations Examinations, Preparation and Validation of. Performance tests measure the execution of tasks and subtasks and involve operations with observable results. For Airway Facilities, performance tests shall be developed in accordance with FAA-D-2781, Airway Facilities Performance Examinations, Preparation and Validation of.

7-7. DID-9 Lesson Plan. Lesson plans are used by the course instructor as a guide for delivering the training. Each lesson plan contains an introduction, content presentation, and summary.

Lesson plans follow an outline format for easy reference by an instructor and reflect instructor and student activities. Lesson plans shall relate new learning to the current job when supplemental training is being delivered.

7-8. DID-10 Student Materials. Student materials such as guides, workbooks, and manuals directly correspond to the instructor lesson plans. The student materials support the instruction, are sequenced in the same manner as the lesson plans, and are developed from the content of the instructor lesson plan. However, student materials do not duplicate word-for-word the content of the instructor lesson plan. Student materials include informational handouts, reading assignments, learning activities, job sheets, and review exercises which the students use during the lessons.

7-9. DID-11 Media Materials. Media materials include all video, audio, and visual materials which can support and enhance the instructional presentation. Media material selection is dependent on the training situation for which they are used and the objectives they are to support.

7-10. DID-12 Commercial Off-The-Shelf Training Materials Report. The commercial off-the-self training materials report provides the FAA with information for assessing the suitability of commercial off-the-shelf (COTS) training materials. The analysis presented in this report shall be traceable to the task and skills analysis and the CDG.

7-11. DID-13 On-The-Job Training Instructor Handbook. The on-the-job instructor handbook is used by the on-the-job (OJT) instructor as a guide for delivering training. The on-the-job instructor handbook is organized by lessons. Each lesson contains the activities to be undertaken by the instructor and the student, presented in an outline format.

7-12. DID-14 Job Aids. Job aids are often used to supplement instruction or as an alternative to instruction. They may provide information on the steps in a procedure or may guide the user in making decisions related to a specific job task. Job aids may be used to help in remembering procedural information or to decrease the need for memorization. When used in place of training, some instruction must still be provided on the use of the job aid. Examples of job aids are: checklists, procedural lists, flowcharts, diagrams, and illustrations.

7-13. DID-15 Correspondence Study Materials. Correspondence study materials are individualized, self-paced study materials used in a correspondence course. Correspondence materials shall be developed in accordance with the CDG.

7-14. DID-16 CBI Lesson Specifications. CBI lesson specifications document the design of each CBI lesson and the hardware, software and conventions to be used to produce the lesson. The CBI lesson specifications provide the transition from analysis to the design and production of draft CBI courseware. The CBI lesson specifications are prepared in accordance with the CDG.

7-15. DID-17 Plan for Computer-Based Instruction Testing. The plan for computer-based instruction testing describes how students will be tested using CBI and how resulting test information will be managed by the instructor and/or student.

7-16. DID-18 CBI Validation Plan and Validation Report. The CBI validation plan specifies the activities to be performed to assess the effectiveness and efficiency of CBI materials. The validation report documents the results of the activities described in the CBI validation plan.

7-17. DID-19 Video Treatments. Video treatments are narrative descriptions of the proposed specific content of all video sequences to be included in the CBI courseware. The treatment explains how the video portion will present the course content for the student. The FAA will use these descriptions to evaluate the feasibility of obtaining the necessary images.

7-18. DID-20 Storyboards/Scripts. Storyboards for CBI reflect the instructional intent of each CBI frame. Storyboards provide a picture or detailed script of the content and words that accompany the video. Scripts detail the video sequences to be included in the CBI courseware. Storyboards/scripts shall be developed in accordance with the CDG.

7-19. DID-21 Video Shot List. The video shot list is a listing of all video motion and still frame shots to be used in the CBI development.

7-20. DID-22 CBI Program Documentation. The CBI program documentation supplies a detailed record of the software programming which produces on-screen material for a CBI course.

7-21. DID-23 Interactive Courseware for Training Devices. This DID documents the requirements for deliverables that are developed as part of the interactive courseware for a training device.

7-22. DID-24 Video Courseware. This DID documents the information that the government needs to evaluate the contractor's decisions concerning the content, treatment, and organization of video courseware.

7-23. Developing Effective Instructional Materials. Important principles for writing effective materials include the following:

a. Keep the characteristics of the target population in mind.

b. Use a reading level that is appropriate for the target audience.

c. Use a clear writing style.

d. Use gender-free wording.

7-24. Characteristics of the Target Population. Instructional materials should be developed to address the target population which is specified in the contract for training. Target populations often differ from each other by:

a. Specific terminology used on the job.

b. Job environment (for example, individual versus team.)

c. Workforce demographics (for example, inexperienced employee versus experienced employee).

7-25. Reading Level. Another factor to consider when developing instructional materials is the reading comprehension level of the audience. Reading comprehension of all contractor developed instructional materials shall be at the 9th grade level, unless otherwise specified in the contract.

7-26. Gender-Free Wording. All instructional materials developed for the FAA shall use gender-free wording. For example, use "he/she" or "the student" instead of "he" and "she" when addressing the student in tests, student materials, or lesson plans. Another technique for gender-free wording is to use the plural (for example, students) which permits the use of the pronouns "they/them/their". For example, "Students will complete student critique sheets. Their comments will be summarized in the validation report."

7-27. Validating Instructional Materials. Validation of the instructional materials begins in the development phase and is accomplished through the:

a. Developmental tryout(s) conducted by the contractor.

b. Course walk-through conducted by the contractor with FAA representatives in attendance.

7-28. DID-25 Developmental Tryout(s). The developmental tryout(s) is an assessment of the effectiveness of the instructional materials when they are in a semi-finished or draft form. The contractor presents the instructional materials to representatives of the target population and/or other contractor personnel to elicit discussion. The areas to be assessed include the:

a. Appropriateness of instructions.

b. Readability of visuals.

c. Clarity of test items.

7-29. Need for Developmental Tryout(s). The developmental tryout(s) is an integral part of the development phase. The FAA believes that this methodology aids in producing high quality training products. By taking advantage of this informal process, the contractor should be able to avoid costly revisions to the instructional materials in the later phases of the training development process.

7-30. DID-26 Course Walk-Through. The course walk-through provides a formal point at which the development of the instructional materials is assessed by the FAA. The course walk-through allows for the evaluation of the traceability and integration of the training outcomes, the terminal objectives, and the enabling objectives with the instructional materials. The effectiveness of the technical content, testing strategy, and instructor activities are also assessed during the course walk-through.

7-31. Conducting the Course Walk-Through. The course walk-through is conducted by the contractor and presented to the FAA. The contractor shall provide a team, consisting of the course developer, instructor, and subject matter experts, for the course walk-through. The FAA should be represented at the walk-through by SMEs, education specialists/instructional technologists, and the FAA COTR. No FAA students shall attend the course walk-through.

a. Materials. The approved, revised draft of all instructional materials (lesson plans, tests, student materials, media materials) shall be made available to the FAA during the course walk-through. For example, if a videotape is called for in the lesson plans, it shall be available for viewing, should the FAA choose to do so. A course schedule, which includes

lesson titles, shall be made available at the course walk-through.

b. Presentation. The contractor shall present a shortened version of each lesson of the course in enough detail and depth so that the effectiveness of the training materials, learning sequence, performance activities, tests, and the time allocations can be fully assessed.

7-32. Letter of Authorization. The FAA Contracting Officer provides a formal letter of authorization to the contractor after the course walk-through is completed. The letter authorizes the contractor to perform the first course conduct and specifies the revisions to the instructional materials and CDG before the first class is conducted.

7-33. End of the Development Phase. The course walk-through is the end point of the development phase. At this stage the instructional materials have been validated to determine how well they meet the training needs which were documented in the analysis phase.

7-34. Submission Process. The instructional materials described in this section closely follow one another and shall be submitted in draft form in the following order:

a. The lesson plan.

b. Achievement tests reflecting revisions to the lesson plan.

c. Student materials which include revision to the lesson plan, activities and tests.

CHAPTER 8. DELIVERY

8-1. Purpose. This chapter discusses the delivery phase of the systematic development process in which the course is presented to the student population. The validation process is continued during this phase and is completed after the first formal presentation of the course has been conducted and the course report has been submitted to the FAA.

8-2. Description of the Delivery Phase. The contractor shall present the first conduct of the course, as specified in the contract. Guidelines for the first course conduct are presented in DID-27. FAA representatives who evaluate the technical accuracy and the instructional effectiveness of the course will attend the first course conduct. The FAA representatives will use the lesson plans in conjunction with the course evaluation checklist, specified in DID-27, to review the first course conduct. Since the lesson plans are used as a tool for evaluation, the contractor shall ensure that all instructional materials are current at the time of the first course conduct. These materials shall include revisions/changes made through the previous validation process.

8-3. Critical Actions. Activities during this phase emphasize the integration and success of the instruction, including the determination of the:

a. Effectiveness of the components of the instruction.

b. Methods for revising the course to correct any deficiencies noted.

8-4. Documentation. The deliverable associated with the delivery phase is the course report which is included in the First Course Conduct and Course Report (DID-27).

8-5. DID-27 First Course Conduct and Course Report. The contractor shall conduct the first formal presentation of the course, as specified in the contract.

a. Contractor Supplied Materials. For the first course conduct the contractor shall supply each student with a set of student materials which shall become the property of the student after the training is completed. The contractor shall supply each student with a set of reference materials to be kept in the classroom or laboratory and which shall not be retained by the student.

b. Data Collection. The contractor shall collect and analyze information from three sources during the first course conduct: the attending FAA representatives, the instructor conducting the first course, and the students. The FAA COTR will specify the end-of-course evaluation questionnaire to be completed by the students.

c. Course Report. The course report, submitted to the FAA after the first course conduct, shall document the extent to which the students achieved the objectives, the deficiencies in the instruction, and the accuracy of the time allocations. In the course report the contractor shall recommend revisions to the instruction and a timeline for completion of the revisions by the contractor. The earlier review points in the analysis, design, and development phases should ensure that only minor revisions are required at this point.

8-6. Subsequent Course Conduct. If specified by the contract, the contractor shall conduct a number of classes following the first course conduct. Before conducting subsequent classes, the revisions identified during the first course conduct shall be incorporated. This allows subsequent classes to be taught with revised documentation. As with the first course conduct, the contractor shall supply each student with a set of student materials which shall become the property of the student after the training is completed. The contractor shall also supply each student with a set of reference materials to be kept in the classroom or laboratory which shall not be retained by the student. The contractor shall also supply each student with an end-of-course evaluation questionnaire to be completed after each subsequent class is conducted.

8-7. Data. Following each subsequent class delivery, the contractor shall provide a letter to the FAA which provides the following:

a. Roster of students attending the course.

b. Information for each test, including:

(1) Class average.
(2) Range of scores.
(3) Number of students passing.

c. Original, student, end-of-course, evaluation questionnaires.

d. Originals of all the student tests.

8-8. Final Documentation. Final documentation shall take one of two forms: camera ready format or master reproducible format. The contract specifies the final format for each training deliverable. Final documentation of the course includes the instructional materials and an updated CDG which reflects the current status of the course. Specification 2494, Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books, contains the guidelines for preparing camera ready copy. Depending upon the contract and the timeline for revision, specified in the validation report, all or some of the subsequent classes may be conducted before submission of the final documentation to the FAA.

8-9. Transmittal Letter. A letter of transmittal, from the contractor to the FAA COTR, shall accompany the final course documentation and certify that the approved revisions have been completed.

CHAPTER 9. EVALUATION

9-1. Purpose. This section discusses the evaluation phase of the systematic development process which provides feedback for revision.

9-2. Description of the Evaluation Phase. Evaluation is an ongoing process that determines the effectiveness of a program or course and which identifies needed changes. Evaluation takes two forms: formative and summative. Evaluation activities provide quality control throughout the phases of the systematic development process.

a. Formative Evaluation. Formative evaluation is a process for determining technical accuracy and instructional soundness of materials prior to use. Formative evaluation occurs throughout the training development process and provides feedback that is incorporated into the analysis, design, development, and delivery of the training.

b. Summative Evaluation. Summative evaluation is the assessment of the impact of the training on job performance. This type of evaluation is a process that assesses the effectiveness of the instructional materials in addressing the training and job performance requirements. Summative evaluation activities are generally conducted by the FAA.

9-3. Documentation. Evaluation information is submitted to the FAA COTR in the course report. The FAA documents its evaluation of a course in the course report.

9-4. Course Report. The evaluation phase is completed by the FAA and documented in a course report. The course report certifies that the course described in the CDG has been successfully developed.

9-5. Evaluation/Validation of Computer-Delivered Courseware. Formative evaluation of computer-delivered courseware shall be conducted in accordance with DID-18, CBI Validation Plan and Validation Report.

APPENDIX 1

DATA ITEM DESCRIPTIONS

DATA ITEM DESCRIPTION (DID) -1

1. Title:

Contractor's Proposal for Training

3. Description/Purpose:

This DID establishes the minimum requirements for the content of the contractor's proposal for training. The contractor's proposal for training documents the:

a. Contractor's cost estimates for each line item of the solicitation.

b. Contractor's technical approach to the training requirements stated in the solicitation.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the contractor's proposal for training.

7.2 This DID is applicable to all responses to FAA-initiated solicitations for proposals for training development and/or delivery.

10. Preparation Instructions:

10.1 Reference Documents. The contractor's proposal for training shall be prepared in accordance with the documents referenced in the solicitation.

10.2 Format. The contractor's proposal for training shall be prepared in accordance with the following format requirements, unless otherwise specified in the solicitation:

10.2.1 The contractor's proposal for training shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 The contractor's proposal for training shall have a cover sheet displaying the following information:

a. Document title.

b. FAA solicitation number.

c. FAA office to which the proposal is being submitted.

d. Contractor name and address.

e. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Scope of Work.

b. Systematic Development of Training.

1) Analysis Phase.

2) Design Phase.

3) Development Phase.

4) Delivery Phase.

5) Evaluation Phase.

c. Methodology.

d. Personnel Qualifications.

e. Commercial Off-the-Shelf Training Materials.

f. Assumptions.

g. Cost.

10.2.4 Each of the above named sections in the contractor's proposal for training shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The contractor's proposal for training shall be prepared in accordance with the descriptions provided below:

10.3.1 **Scope of Work.** The scope of work which will be provided by the contractor or subcontractor shall be described in detail for each line item (sub-item) in the solicitation CDRL. The scope of work description shall include:

a. Services to be performed.

b. Development tasks to be performed in order of performance.

c. A milestone schedule for the project as described in DID-2, Milestone Schedule.

10.3.2 **Systematic Development of Training.** The contractor's understanding of, and approach to, a systematic training development process shall be described to accomplish the tasks specified in the statement of work. This section of the proposal shall include discussion of: training analysis, design, development, implementation, and evaluation as each relates to the tasks in the statement of work.

10.3.3 **Methodology.** The contractor's proposed method for determining the following aspects of each course shall be stated in the proposal:

a. Estimated total course length in hours.

b. Estimated time by instructional type and quantity in hours.

c. Special tools, test equipment, and other devices that are necessary to conduct training and are furnished by or arranged for by the contractor.

d. Course materials, including any necessary technical or operational manuals furnished to each student and retained by the student upon completion of the course, reference materials furnished to each student but not retained by the student upon completion of the course, and CBI courseware.

e. Any software or firmware to be taught as a part of a hardware maintenance course, including recognizing

instruction codes, writing programs, installing software patches, and using diagnostic and/or utility routines.

f. Contractor training facilities and a description of each.

g. The contractor's plan for maintaining up-to-date courseware when several iterations of a course will be delivered over time and changes to training content may occur as the result of hardware or software updates to equipment and systems.

10.3.4 **Personnel Qualifications.** The qualifications of the contractor's training personnel shall be described in this section of the proposal. Personnel descriptions shall include the following information:

a. The name, instructional design expertise of key training personnel, and relevant technical expertise of key subject matter experts. Key personnel shall consist of those positions performing the training analysis, design, development, delivery, and evaluation, as well as the project manager.

b. The contractor management capabilities, available resources, and organization.

c. The type and quantity of work to be performed by a subcontractor(s), including specific tasks and products.

d. The degree of control to be exercised over subcontractor performance by the prime training contractor.

e. The subcontractor's capabilities, including technical expertise, qualifications to perform specific tasks, and available resources to assure successful performance.

10.3.5 **Commercial Off-the-shelf Training Materials.** If the contractor proposes commercial off-the-shelf training materials as a course or for any part of a course, the contractor shall provide the information specified in paragraph 10.3 of DID-12, Commercial Off-the-shelf Training Materials Report, as a section of the proposal.

10.3.6 **Best Commercial Practice.** When training materials are to be developed according to best commercial practice, the following requirements shall be met:

a. A systems approach to training development shall be used.

b. Traceability between the task analysis data and the course design guide shall be provided. Terminal objectives shall be traceable to tasks selected for training.

c. Best commercial practice shall provide flexibility from the standpoint of format, not content. It shall not be used to shortcut the application of instructional systems design processes and procedures.

d. Formats for best commercial practice shall be submitted to the FAA COTR for review and approval prior to use.

10.3.7 **Assumptions.** The contractor shall state any assumptions made in the proposal such as government-furnished equipment and/or information, level of fault isolation to be taught, equipment to be taught, and any other assumptions that have been made.

10.3.8 **Cost Information.** This section shall provide cost information, including overhead clearly indicated, for each line item in the Contract Data Requirements List (CDRL) or sub-item in the solicitation as indicated below:

a. Labor requirements, by labor category or skill level for each task.

b. The number of hours required to accomplish the task for each labor category or skill level.

c. The following information in separate summary forms:

1) Total labor hours and subtotals for the hours for each labor category or skill level for each year.

2) Labor hours per month by labor category or skill level for each task.

3) Total cost and hours for each task.

d. Travel requirements and costs by task. Travel requirements shall be listed by the number of round trips, and, for each trip, the destination, number of people traveling, and duration, including travel time, shall be provided. Travel requirements shall identify the labor categories involved and the specific work to be performed during the travel.

e. Training equipment and costs. All training equipment, documentation, and software required to develop and/or deliver the training shall be listed for each task with the costs for each item.

f. Subcontracted items and costs. All the subcontracted items or activities shall be listed and the cost shall be stated for each.

g. Printing, reproduction, and miscellaneous costs. All printing, reproduction, and miscellaneous costs shall be stated. The number of pages or copies to be made shall be estimated and stated.

h. Costs of the contractor-furnished parts, equipment, tools, and test equipment.

i. Costs of special leased equipment or services; for example, leased lines and terminals.

j. The general and administrative overhead cost, profit or fee, cost of money, and any other associated costs.

k. The total loaded cost for each CDRL line-item.

l. The total loaded cost for the sum of all the contract training items.

m. The assumptions or conditions for the estimates. The special conditions, outside the control of the contractor, that must be met to accomplish the work quoted shall be identified.

DATA ITEM DESCRIPTION (DID) -2

1. Title:

Milestone Chart

3. Description/Purpose:

The Milestone Chart DID contains instructions for the preparation of a time-based chart which shows the start and end points for the development and review of each training deliverable specified in the contract. It is used as a management tool by the FAA. The milestone chart reflects the current status of the training deliverable schedule. It is updated whenever an approved change to the deliverable schedule occurs.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of a Milestone chart.

7.2 This DID is applicable to all contract training development and/or delivery efforts.

10. Preparation Instructions:

10.1 Reference Documents. The Milestone Chart shall be prepared in accordance with the FAA's solicitation for contractor training.

10.2 Format. The Milestone Chart shall be prepared in accordance with the following format requirements, unless otherwise specified by the solicitation:

10.2.1 The Milestone Chart shall be delivered on 8.5" x 11" bond paper and shall be in landscape orientation and shall be organized as shown in Figure 2-1. A foldout may be used as required.

10.2.2 The Milestone Chart shall have a cover sheet displaying the following information:

a. Document title.

b. Solicitation reference number and/or course identification number/course title.

c. Contract number, when submitted after contract award.

d. Contractor name and address.

e. Submission date.

10.3 Content Requirements. Each Milestone Chart shall be prepared in accordance with the descriptions below:

10.3.1 The Milestone Chart shall show the days after contract award and the calendar months for the project on the horizontal axis. The training deliverables, as specified in the solicitation or contract, shall be listed on the vertical axis.

10.3.2 The Milestone Chart shall indicate, for each deliverable, the time allowed for:

a. Contractor development.

b. FAA review, which shall be estimated at 45 working days.

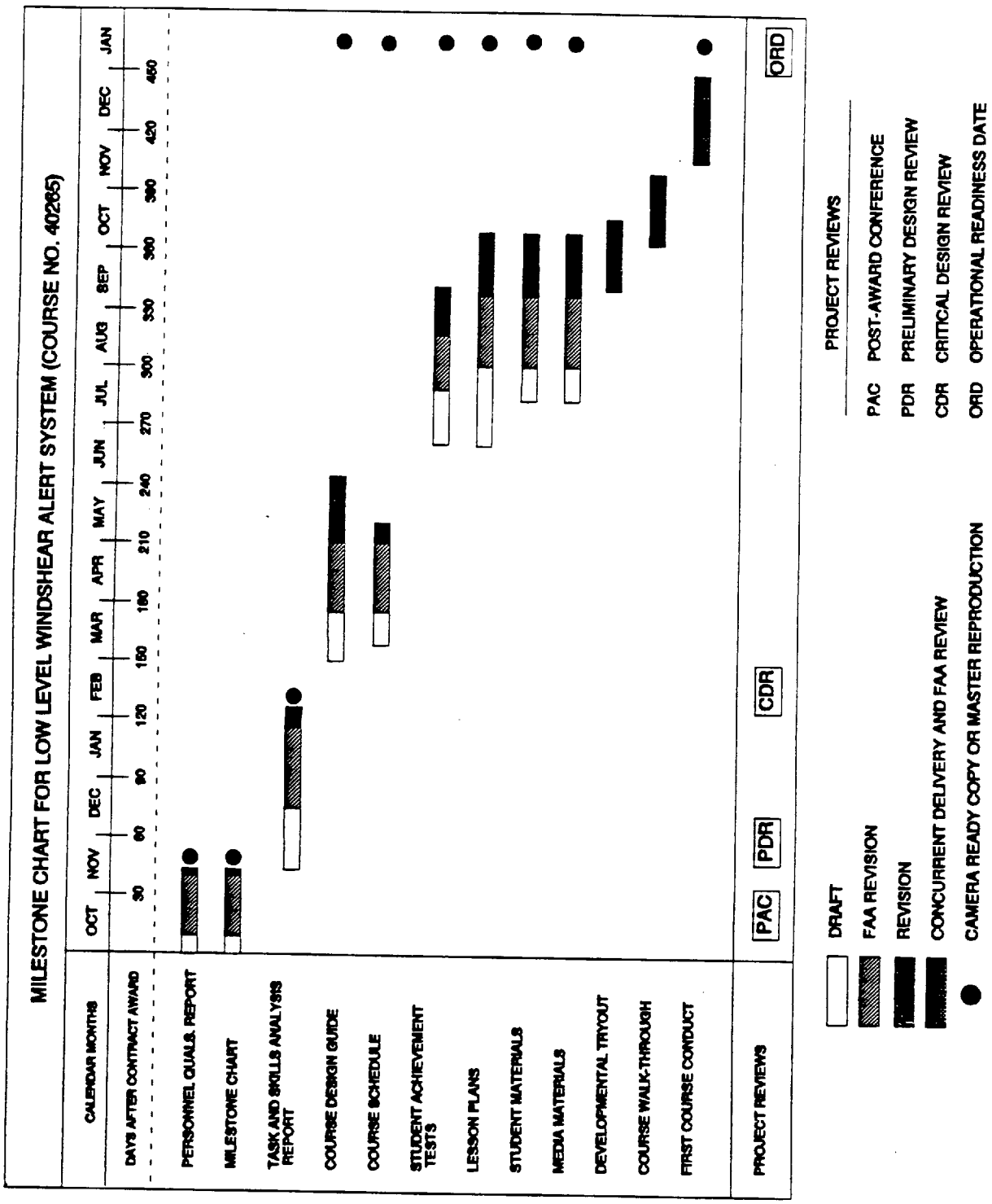
c. Revision of the material by the contractor, which shall be estimated at 30 working days.

d. Submission of the final form of the deliverable.

10.3.3 The Milestone Chart shall indicate when scheduled project review meetings will occur.

10.3.4 The Milestone Chart shall be titled with the course title and number.

DID 2, FIGURE 1. SAMPLE MILESTONE CHART



DATA ITEM DESCRIPTION (DID) -11

1. Title:

Media Materials

3. Description/Purpose:

This DID establishes the minimum requirements for contractor-developed media materials which will support and enhance the instructional presentation by supplying the students with various formats from which to gather information.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format of different types of media materials.

7.2 This DID is applicable to all contract training development efforts in which the contract specifies media materials as a deliverable.

10. Preparation Instructions:

10.1 **Reference Documents.** Media materials shall be prepared in accordance with the documents referenced in the contract.

10.2 **Format.** Media materials shall be prepared and delivered in accordance with the following format requirements or in the form best suited for their use, as defined by the contract.

10.2.1 **Print Materials.** Print materials shall be delivered in the form best suited for their use and with consideration as to the type of material, as defined by the contract, and in accordance with the following:

10.2.1.1 Books shall be bound. Foldout pages may be used as required.

10.2.1.2 Periodicals shall be intact and without missing pages.

10.2.1.3 Pamphlets with multiple pages shall be either bound or stapled. Tri-fold pamphlets and other formats shall be acceptable if agreed upon by the FAA prior to the pamphlet's production and/or distribution.

10.2.1.4 Maps shall be supplied intact and shall be of a magnification appropriate to supporting the instruction, as defined either by the contract or the FAA COTR.

10.2.1.5 The format for other print materials shall be determined on a case-by-case basis by the FAA, and shall be specified in the contract.

10.2.2 **Still Visuals.** Still visuals shall conform to the following format:

10.2.2.1 Still visuals shall have information on the portion of the slide or overhead that permits viewing by all students within a classroom. The portion of the slide or overhead that permits viewing shall be an area 4.625" x 6.5" in the center of a 6" x 9" projected grid. The area surrounding the designated center portion of the grid shall be used only for the overflow of artwork and other information not essential to the message being presented.

10.2.2.2 All background in still visuals shall be soft, non-obtrusive colors, with the exception of response items. Response items shall be in the negative state (white letters on black or royal blue background). Backgrounds shall not interfere with the message of the visual. When artwork appears on the visual, the background shall contrast, rather than blend in, with the letter information of the artwork.

10.2.2.3 The leading, or space between lines on a still visual shall be two points, unless otherwise specified by the FAA.

10.2.2.4 All information on a still visual shall be in typeface 7 or 8, using upper and lower case letters, except for titles, labels, phraseology, and flight progress strips which shall be in all capital letters.

10.2.2.5 Italics may be used on a still visual in any typeface or size to indicate emphasis.

10.2.2.6 Fourteen point character size shall be used for slide numbers, audiovisual control numbers, and flight strip typewritten data, all of which are normally displayed in all capital letters.

10.2.2.7 Eighteen point size shall be used on still visuals for narrative data which is normally displayed in upper and lower case letters.

10.2.2.8 Twenty-four point size shall be used on still visuals for titles which are normally displayed in all capital letters.

10.2.2.9 All edges of a contact print shall be taped down with clear, cellophane tape when inserted in the visual position in the master lesson plan. A contact print is the black and white print (3" x 4") reproduced from the technistat which is the black and white printed copy of artwork used for producing a master copy or contact print.

10.2.3 **Audio Materials.** The format requirements for audio materials shall be determined by the FAA on a case-by-case basis and shall be specified in the contract.

10.2.4 **Motion Visuals.** The format requirements for motion visuals shall be determined by the FAA on a case-by-case basis, and shall be specified in the contract. When a video tape is to be developed, deliverables shall be prepared in accordance with DID-24, Video Courseware.

10.2.5 **Actual Objects.** The format requirements for actual objects shall be determined by the FAA on a case-by-case basis, and shall be specified in the contract.

10.3 Content Requirements. The following types of media materials shall be developed, as specified by the contract:

10.3.1 **Print Materials.** Print materials, which included printed or duplicated aids to support the instruction, shall include, but are not limited to:

a. Books.

b. Periodicals.

c. Pamphlets.

d. Maps.

10.3.2 **Still Visuals.** Still visuals, which are graphic aids displayed as slides, overheads, or on a flipchart, communicate facts and ideas through a combination of pictures, drawings, symbols, and words. The types of still visuals to be developed shall be agreed upon by the FAA prior to their development. The types of still visuals that may be required include, but are not limited to:

a. Illustrations.

b. Figures.

c. Schematic diagrams.

d. Tables.

e. Flowcharts.

10.3.3 **Audio.** Types of audio include disc and tape recordings and their associated equipment. The types of audio shall be specified by the contract or agreed upon by the FAA prior to development. The types of audio that may be required include, but are not limited to:

a. Magnetic cassettes.

b. Reel-to-reel tape.

c. Compact discs.

10.3.4 **Motion Visuals.** Motion visuals supply the student with information via the sight of dynamic motion. Types of motion visuals shall be specified by the contract, or otherwise agreed to by the FAA prior to development. When a video tape is to be developed, deliverables shall be prepared in accordance with DID-24, Video Courseware. Types of motion visuals include, but are not limited to:

a. Black and white films.

b. Color films.

c. Videotape.

d. Computer-based instruction (CBI) graphic animation or motion video segments.

10.3.4.1 When computer-based instruction is used to present motion visuals, these visuals shall be developed in accordance with the CBI DIDs.

10.3.5 **Actual Objects.** Actual objects are either the real object or scale models, mock-ups, cutaways, or simulators. The type of actual object to be developed shall be agreed upon by the FAA prior to its development, or else specified in the contract.

DATA ITEM DESCRIPTION (DID) -12

1. Title:

Commercial Off-the-Shelf Training Materials Report

3. Description/Purpose:

This DID specifies the minimum requirements for the content of the Commercial Off-the-Shelf Training Materials Report. The Commercial Off-the-Shelf Training Materials documents the:

a. Contractor's assessment of the suitability of the commercial off-the-shelf (COTS) training materials for a specific FAA application.

b. Contractor's development and validation procedure for COTS materials.

c. Objectives, content, and any supporting materials for the COTS materials.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the Commercial Off-the-Shelf Training Materials Report.

7.2 This DID is applicable to all contract training development and/or delivery efforts for which the contractor has determined that COTS materials are suitable for use in support of either the development or delivery of the instruction.

10. Preparation Instructions:

10.1 **Reference Documents**. The Commercial Off-the-Shelf Training Materials Report shall be prepared in accordance with the documents referenced in the contract and the CDG.

10.2 **Format**. The Commercial Off-the-Shelf Training Materials Report shall be prepared in accordance with the following format requirements:

10.2.1 The Commercial Off-the-Shelf Training Materials Report shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center. Copies of all materials referenced in the Commercial Off-the-Shelf Training Materials Report shall be delivered concurrently with the report to the FAA for review.

10.2.2 The Commercial Off-the-Shelf Training Materials Report shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.3 A Table of Contents shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Proposed COTS Training Materials.

b. Target Population.

c. Tailoring Requirements.

d. Content Overview.

e. COTS Course Outline.

f. Materials List.

g. Special Equipment.

h. References.

i. COTS Course Validation Procedures.

10.2.4 Each of the Commercial Off-the-Shelf Training Materials Report sections named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The Commercial Off-the-Shelf Training Materials Report shall be prepared in accordance with the descriptions provided below:

10.3.1 **Proposed COTS Training Materials.** This section of the report shall indicate the name of the proposed COTS training materials and their function, and shall contain information that validates the ability of the proposed COTS training materials to satisfy the required training need.

10.3.2 **Target Population.** The target population for whom the COTS materials were designed, its characteristics with regard to reading and experience levels, and other relevant factors shall be included in this section of the report. This section of the report shall also include descriptions of other populations with whom the materials have been successfully used.

10.3.3 **Tailoring Requirements.** All modifications to the proposed COTS training materials, to maintain consistency with the specifications of the CDG and to meet the training requirement, shall be stated in this section. This section shall also include the proposed timeframe for all modifications to the COTS training materials.

10.3.4 **Content Overview.** The content of the training materials and the methods and media used for delivery shall be briefly described in this section of the report.

10.3.5 **COTS Course Outline.** This section of the report shall contain the outline of the course, including each lesson or module, the objectives, methods and media, and time required to conduct each segment, if these have been previously determined at the time of report submission.

10.3.6 **Materials List.** Each component associated with the COTS training materials shall be listed in this section by title. The list shall also indicate the duration of use of each component. The instructor materials and the student materials shall be separately identified and shall appear on separate pages of the section.

10.3.7 Special Equipment. Each piece of special equipment needed to conduct the training shall be listed in this section.

10.3.8 References. The Reference section shall include at least the names of two users of the materials, their organization(s), and their telephone numbers.

10.3.9 COTS Course Validation Procedures. The course validation procedures and expected results shall be contained in this section, if such procedures have been determined at the time of report submission.

10.4 Testing. Knowledge and performance tests shall be in accordance with the requirements of DID-8, Student Achievement Tests, unless formal approval for deviation is received from the FAA COTR.

10.5 Copyrights. The FAA shall have the right to reproduce the COTS materials, which the FAA has approved for use during training, without additional fees or licensing. Permission to copy shall apply to all COTS materials, regardless of format.

DATA ITEM DESCRIPTION (DID) -13

1. Title:

On-the-Job Training Instructor Handbook

3. Description/Purpose:

This DID establishes the minimum requirements for the content of the On-the-Job Training (OJT) Instructor Handbook. The OJT Instructor Handbook documents the:

a. Instructions for the OJT instructor.

b. Subject outline for the OJT.

c. Performance evaluation criteria for assessing student performance.

d. Student achievement tests to be used with the OJT.

e. Instructional materials to be used with the OJT.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the On-the-Job Training Instructor Handbook.

7.2 This DID is applicable to any contractor-developed training effort for which there is an on-the-job instructional component.

10. Preparation Instructions:

10.1 Reference Documents. The On-the-Job Training Instructor Handbook shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 Format. The On-the-Job Training Instructor Handbook shall be prepared in accordance with the following format requirements:

10.2.1 A camera-ready or master reproducible copy of the On-the-Job Training Instructor Handbook shall be delivered on 8.5" x 11" bond paper. An electronic

version shall be delivered,if so required by the contract. The handbook shall be labeled in accordance with the labeling system determined by the FAA organization for which the training was developed. Foldout pages may be used as required. All pages shall be numbered at the bottom center. Each section of the On-the-Job Training Instructor handbook shall start on a new page, with the section title as the heading on the page. The materials in the On-the-Job Training Instructor Handbook shall be organized into lessons based on the objectives stated in the CDG. The OJT lessons shall be sequenced in the order that will promote the most effective learning. The FAA COTR shall specify the format for the OJT lessons. The OJT lessons shall be formatted in either lesson plan format as specified in DID-9 or in job sheet format as specified in DID-10.

10.2.2 The On-the-Job Training Instructor Handbook shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson title(s).

d. Submission date of handbook.

e. Statement that the document is for training purposes only.

10.2.3 The On-the-Job Training Instructor Handbook shall have a Table of Contents following the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Reference Materials.

b. Figures and Tables List.

c. Lesson(s).

d. Post-Test.

e. Glossary.

f. Acronyms.

10.2.4 Each of the On-the-Job Training Instructor Handbook sections named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 **Content Requirements.** The On-the-Job Training Instructor Handbook shall be prepared in accordance with the descriptions provided below:

10.3.1 **Reference Materials.** All reference materials used in the handbook shall be listed by title.

10.3.2 **Figures and Tables List.** All figures appearing in the handbook shall be listed by title.

10.3.3 **Lessons.** Each lesson shall be comprised of the following sections:

a. Objectives.

b. Required Tools and Test Equipment.

c. Special Instructions.

d. Precautions.

e. Pretest.

f. Body of Lesson.

g. Performance Evaluation Criteria.

h. Progress Test(s).

10.3.3.1 **Objectives.** All terminal objectives and enabling objectives, as stated in the CDG, related to the lesson shall be listed.

10.3.3.2 **Required Tools and Test Equipment.** All tools and test equipment required to perform the activities specified in the lesson shall be listed.

10.3.3.3 **Special Instructions.** Any special instructions for conducting OJT activities specified in the lesson shall be stated.

10.3.3.4 Precautions. Any precautions that are to be taken during the OJT activities specified by the lesson shall be stated.

10.3.3.5 Pretest. Each lesson shall contain a Pretest and answer key. Pretests and associated answer keys shall be developed in accordance with Student Achievement Tests, DID-8.

10.3.3.6 Body of Lesson. Each lesson shall specify at least one student activity. The tasks and subtasks of the activity to be performed by the instructor and the tasks and subtasks of the activity to be performed by the student shall be stated in clearly written sentences which begin with action verbs. Each task name shall be proceeded by a number, beginning with the label "1" for the first task. Each subtask shall be proceeded by an alphabetic character, beginning with "a." The tasks and subtasks performed by the instructor shall be labeled "I" for instructor. The tasks and subtasks performed by the student shall be labeled "S" for student.

10.3.3.7 Performance Evaluation Criteria. Performance evaluation criteria shall be developed for each student activity specified in the lesson.

10.3.3.8 Progress Test(s). Each lesson shall contain at least one Progress Test and associated answer key. Progress Tests and answer keys shall be developed in accordance with Student Achievement Tests, DID-8.

10.3.4 Post-Test. Each handbook shall contain a Post-Test and associated answer key. The Post-Test and answer key shall be developed in accordance with Student Achievement Tests, DID-8.

10.3.5 Glossary. A glossary containing all technical words, and their definitions, presented during the training shall appear in this section of the handbook.

10.3.6 Acronyms. A list of all acronyms used in the handbook, and their meanings, shall appear in this section of the handbook.

DATA ITEM DESCRIPTION (DID) -14

1. Title:

Job Aids

3. Description/Purpose:

This data item description (DID) documents the requirements for the development of job aids. Job aids are used to supplement instruction or as an alternative to instruction. They may provide information on the steps in a procedure or may guide the user in making decisions related to the performance of a job task. Examples of job aids are: checklists, procedural lists, templates, flowcharts, diagrams, and illustrations.

7. Application/Interrelationship:

7.1 This DID contains the preparation instructions for the format and content of job aids.

7.2 This DID is applicable to all contract training development that requires job aids as a deliverable.

10. Preparation Instructions:

10.1 Reference Documents. The information cited in this DID shall be prepared in accordance with FAA-STD-028B and the documents referenced in the contract.

10.1.1 The government will provide existing task analyses when these will facilitate the development of a job aid. When the task and skills analysis and/or the cognitive analysis were developed in accordance with FAA-STD-028B, the data obtained from DIDs 4 and 5 of the standard shall be used as input to the job aid.

10.2 Format. The format for a job aid will vary depending upon the environment and conditions in which it will be used, the purpose for which it is being developed, and the user population. Recommendations on the format for a job aid shall be submitted to the government for review and approval prior to

development. Sufficient detail shall be provided to reflect the contractor's analysis and how the recommendations were formulated. When developing recommendations on format, paragraphs 10.3.1 through 10.3.5 of this DID shall be considered.

10.2.1 A job aid that is to be automated shall require compatibility with the existing hardware and software capabilities at the site(s) where the job aid will be used. The hardware and software specifications at the site(s) will be provided by the government upon request. The contractor's specifications and approach for any automated job aids shall be submitted to the government for review and approval prior to development.

10.3 Content Requirements. The following information shall be provided:

10.3.1 **Purpose.** The purpose of the job aid, including information on whether it will be used to supplement or to decrease the need for training, shall be documented. When the job aid will be used as an alternative to training, instruction shall still be provided on the use of the job aid. The content of this instruction shall be provided to the government for review and approval prior to implementation.

10.3.2 **User Population.** A description of the user population shall be provided.

10.3.3 **User Environment.** A description of the environment in which the job aid will be used shall be provided. This description shall document any job or training conditions that will influence the design and use of each job aid.

10.3.4 **Traceability Matrix.** A matrix shall be developed that documents the tasks, subtasks, and any task elements that comprise the job aid. These job performance components shall be cross-referenced by number to the task and skills analysis and/or cognitive analysis on which each job aid is based. When the job aid will be used in a training environment, the supporting terminal and enabling learning objectives from the Course Design Guide shall also be documented.

10.3.5 **Selection Criteria.** The criteria for making the decision to use a job aid shall be documented. Examples of selection criteria to be considered are frequency of task performance, task criticality, and task complexity.

10.3.6 **Prototype Development.** Pending the government's approval of the information provided in paragraphs 10.3.1 through 10.3.5 above, a prototype job aid shall be developed. The directions for use of the job aid shall be provided with the prototype. The format for the job aid shall be developed in accordance with the government-approved information provided in paragraphs 10.2. and 10.2.1 of this DID. The job aid and directions for use shall be revised, based on government review comments, prior to validation.

10.3.7 **Validation.** The plan for validation of the revised job aid and the directions for use shall be documented. The validation environment and user population shall closely resemble the actual environment, conditions, and user population for which the job aid was designed. When the job aid will be used in a training environment, applicable validation guidance in FAA-STD-028B shall be applied. The job aid and directions for use shall be revised based on the results of the validation.

DATA ITEM DESCRIPTION (DID) -15

1. Title:

Correspondence Study Materials

3. Description/Purpose:

This DID establishes the minimum requirements for the content of correspondence study materials. The correspondence study materials document:

a. Reading assignment(s) and supporting illustrations.

b. Review exercise(s) and associated answer keys.

c. Student progress tests.

d. Post-test.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of correspondence study materials.

7.2 This DID is applicable to any contract training effort for which correspondence study materials are required by the contract.

10. Preparation Instructions:

10.1 Reference Documents. Correspondence study materials shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 Format. Correspondence study materials shall be prepared in accordance with the following format requirements:

10.2.1 A camera-ready or master reproducible copy of the correspondence study materials shall be delivered on 8.5" x 11" bond paper. An electronic version shall be delivered, if so specified by the contract. Foldout pages may be used as required.

All pages shall be numbered at the bottom center. The study materials shall be labeled in accordance with the labeling system designated by the FAA organization for which the material is developed. The correspondence materials also shall be divided into chapters representing one lesson. Each chapter shall be sub-divided into manageable sections. Each subdivision shall be labeled. Format and style shall be in accordance with the following publication, or as specified in the contract:

a. Style Manual, Government printing Office, Washington, D. C.

10.2.2 Correspondence study materials shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Preparation date of materials.

d. Statement that the document is for training purposes only.

10.2.3 Correspondence study materials shall have a Table of Contents following the cover sheet specifying the page numbers. The first item the Table of Contents shall include is the Information Page. The Table of Contents shall include, subsequent to the Information Page, the following sections for each lesson:

a. Reading Assignment(s).

b. Review Exercise.

c. Answer Key.

d. Lesson Progress Test.

The concluding items in the Table of Contents shall include the:

a. Post-Test.

b. Glossary.

c. Acronyms.

10.2.4 Each of the section named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 **Content Requirements.** Correspondence study materials shall be prepared in accordance with the descriptions provided below:

10.3.1 **Information Page.** The information page shall include:

a. Brief description of the course.

b. List of the course materials.

c. Grading procedures.

d. Address to which students are to mail completed materials.

e. A statement of how to obtain assistance.

10.3.2 **Reading Assignment(s).** Reading assignments and supporting illustrations shall be developed for each lesson. Each reading assignment shall include:

a. Introduction.

b. Body of the assignment.

c. Supporting illustrations.

10.3.2.1 The introduction shall include:

a. A list of the objective(s) of the assignment as stated in the CDG.

b. Several thought-provoking questions related to the reading.

c. A tie-in to previous materials, if appropriate.

10.3.2.2 The body of the assignment shall:

a. Be limited in length to 7 to 10 pages.

b. Use an active verb to begin procedures and/or instructions.

c. Emphasize key information by highlighting the text with bold face, italics, underlining, or graphics.

d. Have all illustrations referred to by number within the text.

e. Conclude with a summary of the assignment.

10.3.2.3 The supporting illustrations shall reinforce key points in the reading assignments. The supporting illustrations shall:

a. Be numbered sequentially, in accordance with the chapter/the lesson in which it is contained; for example, consecutive illustrations in chapter 5 would be labeled "Figure 5-1," "Figure 5-2."

b. Provide a caption that specifically labels the subject treated in the illustration.

c. Be located on the same page as the text for the illustration. If this is not possible, the illustration shall be placed on the next page.

d. Be sharp and clear.

10.3.3 **Review Exercise.** A review exercise which measures the accomplishment of the learning objective(s) shall be developed for each chapter/lesson. Each exercise shall have the items within it sequenced in the same order as the reading assignments to which they pertain. A variety of test item formats shall be used.

10.3.4 **Answer Key.** An answer key shall be developed for each review exercise. The answer key shall:

a Not be visible when the student is completing the review exercise.

b. Provide a comprehensive, correct answer for each review exercise item.

c. Provide answers in the same sequence as their respective review exercise items.

10.3.5 **Progress Test.** A progress test shall be developed for each lesson/chapter. The progress test shall measure the mastery of the learning objectives. The progress test shall be developed in accordance with Student Achievement Tests (DID-8).

10.3.6 **Post-Test.** A post-test shall be developed for the course. The post-test shall measure the mastery of each terminal objective for the course, as stated in the CDG. The post-test shall test only for information which is included in the text. The post-test shall be developed in accordance with Student Achievement Tests (DID-8).

10.3.7 **Glossary.** A glossary shall be developed which shall contain all technical and uncommon terms, and their definitions, used in the correspondence study materials.

10.3.8 **Acronyms.** A list of acronyms shall be developed which shall contain all acronyms and abbreviations, and their full written-out form, used in the correspondence study materials.

DATA ITEM DESCRIPTION (DID) -3

1. Title:

Personnel Qualifications Report

3. Description/Purpose:

This DID establishes the minimum requirements for the content and format of the personnel qualifications report. The personnel qualifications report contains a description of the contractor personnel who will be involved in the development and/or delivery of training.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the personnel qualifications report.

7.2 This DID is applicable to all contract training efforts.

10. Preparation Instructions:

10.1 Reference Documents. The personnel qualifications report shall be prepared in accordance with the documents referenced in the contract.

10.2 Format. The personnel qualifications report shall be prepared in accordance with the following format requirements:

10.2.1 The personnel qualifications report shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered as required.

10.2.2 The personnel qualifications report shall have a cover sheet displaying the following information:

a. Document title.

b. Contract number.

c. Contractor name and address.

d. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Introduction.

b. Development Team.

c. Tasks and Personnel.

d. Resumes.

10.2.4 Each of the above named sections of the personnel qualifications report shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The personnel qualifications report shall be prepared in accordance with the descriptions provided below:

10.3.1 **Introduction.** The introduction to the personnel qualifications report shall contain:

a. A summary of the training requirement.

b. An overview of the contract tasks for designing, developing, and delivering the training.

10.3.2 **Development Team.** The key members of the development team shall be listed by name and categorized by type. The duties listed for each position may be shared by more than one individual or divided among several individuals. One individual may serve in multiple roles. The positions for the development team are as follows:

a. Management personnel (e.g., project manager and task managers), who are responsible for the day-to-day management of the technical performance and costs of the training development effort.

b. Instructional designer, instructional technologist, or instructional developer, who is responsible for sequencing the content, providing instructional

strategies, and developing and documenting the lesson content as specified by the SME.

c. CBI programmer, who is responsible for implementing all training that is to be presented on a computer. this position is required only in the case in which computer-based instruction (CBI) is being procured.

d. Subject matter expert (SME), who is responsible for lesson content and for assuring the content validity and technical accuracy of the materials.

10.3.3 **Tasks and Personnel.** All contract tasks for performing analyses, designing, developing, delivering instruction shall be listed. For each task, the names of all personnel who will be involved with the task shall be listed.

10.3.4 **Resumes.** Resumes shall be provided for all project personnel. Each resume shall include:

a. Personnel category as defined in paragraph 10.3.2 of this DID.

b. Summary of experience which includes the number of years of experience in major skill areas, such as instructional design and development, user training, project management, etc.

c. Education which includes high school, college and technical schools, the year graduated, degrees, diplomas, licenses, certificates, and major fields of study.

d. Work experience which is a list of work experience beginning with the most recent and indicates the organizations' names, and year of employment with each organization.

e. Professional recognition awards and relevant publications.

DATA ITEM DESCRIPTION (DID) -4

1. Title:

Task and Skills Analysis Report

3. Description/Purpose:

A task and skills analysis is performed to identify changes in job performance resulting from the introduction of new equipment and technology and from new workforce requirements. A task and skills analysis provides specific data which are needed to make decisions about the design, development, and delivery of both management and technical training courses.

7. Application/Interrelationship:

7.1 This data item description (DID) contains the preparation instructions for the format and content of the task and skills analysis. See DID-5 for preparation instructions for cognitive task analysis deliverables.

7.2 This DID is related to Logistics Support Analysis (LSA) data when such a data file is a contractual requirement. Existing task analyses, work load models, and other relevant data provided as government furnished information shall be used during development of the task and skills analysis so that existing data are not duplicated. Data generated by the task and skills analysis will be used to develop the course design guide. The task and skills analysis must be approved by the government prior to submission of subsequent training deliverables for government review.

7.3 The task and skills analysis shall be submitted in draft form. The contractor shall incorporate FAA comments and submit a revised draft for review. The contractor shall again revise the task and skills analysis if the FAA considers the deliverable inadequate or inconsistent with comments received during the FAA review.

10. **Preparation Instructions:**

10.1 **Reference Documents.** The task and skills analysis shall be prepared in accordance with chapter 5 of FAA-STD-028B and in accordance with the contract.

10.2 **Format.** The task and skills analysis shall be prepared in accordance with the following format:

10.2.1 The deliverables shall be provided on 8 1/2 by 11 inch bond paper with the date of the submission. Foldout pages may be used as required. All page numbers shall be placed at the bottom center of each page. The deliverables shall also be provided on an electronic medium when specified in the contract.

10.2.2 Task data sheets shall be developed to display all task analysis data cited in paragraphs 10.3.3 through 10.3.3.10 of this DID. The data shall be organized in columnar format for horizontal display on a single table as shown in Figure 4-1.

10.3 **Content Requirements.** The task and skills analysis shall contain the following:

10.3.1 **Front Matter.** The front matter shall contain a preface, table of contents, list of figures, and list of tables.

10.3.2 **Section I - Introduction.** This section shall contain the following information:

a. Purpose and scope of the document.

b. Organization of the document.

c. Applicable references.

d. Overview of the equipment, technology, and workforce changes which require a task and skills analysis to be conducted.

e. Overview of the procedures used to conduct the task and skills analysis and specification of the criteria used to identify tasks selected for training. Information on the sources of data, the group of employees who provided data, their occupations, the level of experience within the occupation, and

whether the data were obtained through observation or interview shall also be provided.

10.3.3 **Section II - Task and Skill Analysis Data.** This section shall contain the following information:

a. Introduction to the section.

b. Listing in order of performance of duties, tasks, and subtasks required to operate the equipment. Actions below the subtask level shall also be identified when lower levels of observable and measurable performance are required for course design.

c. Listing in order of performance of duties, tasks, and subtasks required for preventative and corrective maintenance and installation, as well as testing and modifying the equipment. Performance steps below the subtask level shall also be identified when lower levels of observable and measurable performance are required for course design.

d. Listing of management and supervisory duties, tasks, and subtasks when the contract requires development of management training courses.

e. Initiating cues, conditions, and standards associated with the performance of each task and subtask identified in 10.3.3. b, c, and d above.

f. Determination of knowledge and skills required for task and subtask performance.

g. Identification of data on criticality, frequency, and difficulty for each task and subtask.

h. Specification of whether each task and subtask requires training.

i. Designation of each task and subtask as "new" or "old."

j. Specification of the time required to perform each task and subtask.

k. Designation of each task and subtask as an individual performance or a team performance. For team performance, the positions which perform the task and subtask collectively shall also be specified.

10.3.3.1 Task data sheets shall be developed which display the analysis data required in paragraphs 10.3.3 b through k, above. Figure 4-1 is an example of the format for a task data sheet. This format may be modified, as required, to display the data. However, no data shall be eliminated. The task data sheets shall be submitted as part of the task and skill analysis deliverables.

10.3.3.2 Duties, tasks, and subtasks shall conform to the following structure:

a. Duty. A duty shall represent a major subdivision of the work performed by one individual and shall encompass two or more related tasks in one functional area.

b. Task. A task shall represent a unit of work which: (1) is directly observable and measurable, (2) has a clear beginning and ending point, and (3) is performed independent of other tasks. A task shall be written in the form of a statement which begins with an action verb, is followed by the object acted upon, and includes any necessary qualifying information. Task statements shall not begin with the phrase "use the equipment to..." in order to preface the actual task to be performed.

c. Subtask. Tasks shall be broken out into subtasks. Each subtask shall document a single step in task performance.

d. Element. Subtasks to be trained shall be broken out into task elements when observable and measurable performance below the subtask level is required for course design.

10.3.3.3 The following numbering system shall be used to label a job and its associated duties, tasks, subtasks, and elements:

Example:
1.0 Job
1.1 Duty
1.1.1 Task
1.1.1.1 Subtask
1.1.1.1.1 Elements (as required)

10.3.3.4 For technical training, operation and maintenance tasks shall be organized in Section II by the type of facility at which the tasks will be performed.

10.3.3.5 Conditions for the performance of each task and subtask shall describe the situation/environment in which the specific job behavior will be carried out. Conditions shall describe any pertinent influence upon task and subtask performance. Standards shall state the criteria for acceptable performance. Cues shall indicate the signal(s) to begin performance of each task and subtask.

10.3.3.6 Each task and subtask shall be designated as "new" or "old." The latter designation shall refer to tasks and subtasks with which job incumbents are familiar because they have been performing them on the job. When any portion of a task is new, then the entire task shall be trained. Existing knowledge and skills may be reviewed in the lesson plan; however, they shall be reviewed in a job context.

10.3.3.7 The knowledge and skills required for performance of each task and subtask shall be documented.

10.3.3.8 Data on the criticality, frequency, and difficulty of each task and subtask shall be documented to assist in the identification of tasks selected for training. Critical tasks and subtasks are defined as those which are essential to job performance, regardless of the frequency with which they are performed. Frequency refers to how often a task and subtask is performed. Difficulty refers to how hard a task and subtask is to learn and perform. A five-point scale shall be used to rate task and subtask difficulty. Maximum and minimum ratings shall be five and one, respectively. Frequency shall be coded as follows: continuous activity (CA), hourly (H), daily (D), weekly (W), monthly (M), and as required (AR). A five-point scale shall be used to rate task and subtask difficulty. Maximum and minimum ratings shall be five and one, respectively.

10.3.3.9 Each task and subtask shall be coded as individual or team performance. The code (I) shall be used to designate individual performance where interaction with another person is <u>not</u> required to carry out a task or subtask. The code (T) shall be used to designate team performance where interaction between two or more individuals is required. The positions or job categories involved in team performance shall be specified as

well as the percentage of time required. The performance of a team task may contain subtasks which are performed independently by an individual.

10.3.3.10 Any information listed in Section II - Task and Skill Analysis Data as "to be determined" shall be supported with a written explanation and a timeline for determining that information. The contractor shall complete this information according to the approved timeline.

10.3.4 **Section III - Manpower Summary Data.** This section shall contain the following information:

a. Introduction to the section.

b. Quantitative position requirements by personnel specialties and skill levels.

10.3.4.1 A personnel position summary table shall be developed which identifies job categories of personnel, types of tasks to be performed by job category, and number of personnel to be trained.

10.3.4.2 Any information listed in Section III - Manpower Summary Data as "to be determined" shall be supported with a written explanation and a timeline for determining that information. The contractor shall complete this information according to the approved timeline.

10.3.5 **Section IV - Appendices.** This section shall contain the following information:

a. List of acronyms.

b. List of abbreviations.

c. Glossary of terms.

d. Index.

e. Other supporting information, as required.

DID 4, FIGURE 1. TASK & SKILLS ANALYSIS DATA SHEET

TASK & SKILLS ANALYSIS DATA SHEET

JOB TITLE _____ DUTY _____ PAGE ____ OF ____

ANALYIST _____ DUTY _____

DESIGNATOR	TASK/SUBTASK ELEMENT	CUES	CONDITIONS	STANDARDS	FREQUENCY	CRITICALITY	DIFFICULTY	NEW/OLD TASK	TIME	TEAM OR INDIVIDUAL	TRAIN/ NO TRAIN	NOTES

DATA ITEM DESCRIPTION (DID) -5

1. Title:

Cognitive Task Analysis

3. Description/Purpose:

A cognitive task analysis is performed when a traditional task analysis indicates that some tasks have a strong cognitive component, such as those requiring the performer to exercise judgment, solve problems, and make decisions. Cognitive task analysis is a systematic process for determining the cognitive processes and strategies that support job performance.

7. Application/Interrelationship:

7.1 This data item description (DID) contains the preparation instructions for the format and content of the cognitive task analysis deliverables.

7.2 When a cognitive task analysis is required as part of curriculum development, it shall be performed after the traditional task analysis, specified in DID-4. Both traditional and cognitive task analyses provide critical information about job performance which will be used to develop the course design guide.

10. Preparation Instructions:

10.1 Deliverables. This DID contains the content and format requirements for three deliverables: a cognitive analysis plan, preliminary cognitive analysis data, and a cognitive analysis report. When specified in the contract, an automated data collection system shall be developed as a repository for cognitive analysis data. The data collection system shall be developed in accordance with contract requirements.

10.1.1 Each deliverable represents a building block in the cognitive analysis process and shall be submitted as a draft for FAA review. The contractor shall incorporate FAA comments and shall submit a revised draft of each deliverable.

The contractor shall revise the deliverables if the FAA considers them inadequate or inconsistent with the comments received during the FAA review.

10.2 Format. Each deliverable shall be submitted on 8.5" x 11" bond paper with the date of the submission. Foldout pages may be used as required. All page numbers shall be placed at the bottom center of each page. The deliverables shall also be provided on an electronic medium when specified in the contract.

10.2.1 The front matter of each deliverable shall contain a preface, a table of contents, a list of figures, and a list of tables.

10.3 Content Requirements.

10.3.1 Cognitive analysis plan. This deliverable shall contain the following information:

a. Purpose and scope of the cognitive analysis.

b. Organization of the document.

c. Applicable references.

d. Overview of the equipment, technology, and workforce changes which require a cognitive task analysis to be conducted.

e. Specification of the criteria used to select tasks for cognitive analysis. The following criteria shall be considered:

1) Complex tasks which require large amounts of knowledge to be learned during training.

2) Complex tasks which have a significant component involving judgment, problem solving, or decision-making.

3) Complex tasks which experts consider difficult to verbalize or demonstrate through overt actions.

4) Complex tasks where there are considerable differences in how individuals perform the tasks due to the number of cognitive strategies available.

f. Documentation of the methods proposed for conducting the cognitive task analysis. The following methods shall be considered:

1) Protocol analysis, in which individuals verbalize what they are doing or thinking about when performing a task.

2) Psychological scaling, in which individuals sort, rate, or rank task-relevant knowledge.

3) Performance modeling, in which a job or task is simulated and a model of task performance is developed and tested under varying conditions.

4) Observation of job performance and interviews to obtain information on reasoning processes of task performers.

g. Information on how data sources will be obtained, the groups of employees to provide data, their occupations, and the experience levels within the occupation.

h. Data collection instruments, for review and approval by the FAA prior to use.

i. Specification of how reliability and validity of the data will be determined.

10.3.2 **Preliminary cognitive analysis data.** This deliverable shall contain the following information:

a. The list of tasks selected for cognitive analysis, based on the approved criteria identified in the cognitive analysis plan. These tasks shall be grouped by duties. If task groupings are different than those specified in the traditional task analysis, DID-4, an explanation for the differences shall be provided.

b. Conditions and standards for task performance.

c. A sample of the results of cognitive analysis for one or more tasks.

d. A summary of the findings from the various data collection methods and instruments used during the

preliminary cognitive analysis and their relevance for the design of training.

e. A description of critical problems encountered and recommendations for change to the cognitive analysis plan, if required.

10.3.3 **Cognitive analysis report.** This deliverable shall contain the following information:

a. The knowledge structure, skills, knowledge, and strategies required for optimal task performance.

b. Visual representation of the knowledge structure for each task.

c. Identification of strategies, heuristics, algorithms, or aids used in job performance.

d. Discussion of the relevance of the cognitive analysis for the design of training:

1) Recommended content and organization of the instructional material.

2) Recommended instructional setting, media, and learning strategies.

DATA ITEM DESCRIPTION (DID) -6

1. Title:

Course Design Guide

3. Description/Purpose:

The Course Design Guide contains three parts. Part I documents the overall approach to training. Part II documents the course design, including the training outcomes, terminal objectives, enabling objectives, type of learning, technical content, instructional methods, and media. Part III contains a traceability matrix which cross references the tasks selected for training with the terminal objectives and with the training outcomes. All learning objectives and training outcomes are sequenced in the CDG in the best order for learning.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the Course Design Guide (CDG).

7.2 This DID is applicable to all contract training development efforts.

10. Preparation Instructions:

10.1 Reference Documents. The CDG shall be prepared in accordance with the documents referenced in the contract and the Task and Skills Analysis Report.

10.2 Format. The CDG shall be prepared in accordance with the following format requirements:

10.2.1 The CDG shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 The CDG shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

Part I - Management Summary

a. Overall Approach.

1) Proposed Methods and Media.

2) Selection Criteria.

3) Course Series.

4) Analysis of Alternate Training Approaches.

b. Equipment.

c. Course Catalogue Entry.

d. Location of Training.

Part II - Course Design

a. Training outcomes.

b. Training objectives.

Part III - Cross Reference Matrix

10.2.4 Each of the CDG sections named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The CDG shall be prepared in accordance with the descriptions provided below:

10.3.1 Part I organization and content shall be as follows:

10.3.1.1 **Overall Approach.** This section shall provide a summary of the overall approach to the training.

a. **Proposed Methods and Media.** This section shall describe the proposed methods and media for the training and the rationale for their selection.

b. **Selection Criteria.** This section shall describe the criteria used for selection of the approach.

c. **Course Series.** This section shall indicate the existing or proposed series of courses which include the course described in the CDG, if applicable.

d. **Analysis of Alternate Training Approaches.** This section shall present an analysis of alternate training approaches to the one described in the CDG. The analysis shall include discussions of state-of-the-art technology, and the rationale for their recommendation or non-recommendation.

10.3.1.2 **Equipment.** This section shall include a description of the equipment that will be used to develop or conduct the training. The section shall include for each type of equipment:

a. Type of equipment.

b. Model of equipment.

c. Number of items of equipment needed.

10.3.1.3 **Course Catalogue Entry.** This section shall contain the course catalogue entry for the course. The course catalogue entry shall include:

a. Course title, which shall be brief and self-explanatory.

b. Course Length.

c. Course description, which shall be a concise and comprehensive description of the course, not to exceed 750 characters, including spaces and punctuation. The course description shall include:

1) For whom the course is designed.

2) How the course will be delivered; for example, classroom, computer-based instruction (CBI),

simulator, laboratory, workshop, flight training, independent study.

3) Purpose and description of the subject matter of the course.

4) Course titles for all the courses in a series, if applicable.

d. Course prerequisite(s), which must be successfully completed prior to enrollment, or for which the student must pass an approved screening examination measuring a level of knowledge/skill equivalent to that which could have been achieved in the prerequisite courses.

e. Other requirements, such as certificates, licenses, and flight hours, which are required before course enrollment.

10.3.1.4 Location of Training. This section shall specify the location(s) of the facilities where the training will be presented.

10.3.2 An example of Part II is shown in figure 6-1. Part II shall contain the following:

10.3.2.1 Training Outcomes. Training outcomes are written at the duty level of the task and skills analysis. Each page of Part II of the CDG shall have one training outcome on it. The training outcomes shall be sequenced in one or more logical training segments. For the purposes of identification and traceability, each training outcome shall be labeled with consecutive upper case letters, beginning with "A."

10.3.2.2 Terminal Objectives. This section of Part II of the CDG shall contain the terminal objectives for each training outcome. The terminal objectives and their supporting data shall conform to the following requirements.

a. The terminal objectives shall be derived from the tasks selected for training in the task analysis. At least one terminal objective shall be written for each task selected for training.

b. Each terminal objective shall have three parts: condition(s), performance, and standards.

c. The terminal objectives shall be sequenced in the best order for learning and shall be numbered consecutively, beginning with "1."

d. The time for reaching each terminal objective shall be estimated and placed in the appropriate column of Part II of the CDG.

e. The type of learning represented by each terminal objective shall be indicated in the appropriate column of Part II of the CDG using the following labels:

1) A terminal objective requiring performance to emphasize major physical skills and abilities, including affective and attitudinal behaviors, shall be labeled "P."

2) A terminal objective requiring primarily cognitive skills, such as knowledge, comprehension, or judgement, shall be shall be labeled "CG." A terminal objective that requires cognitive skills should be analyzed to determine whether it is actually an enabling objective which supports a terminal performance objective. In most cases, cognitive objectives are enabling objectives.

10.3.2.3 **Enabling Objectives.** This section of Part II of the CDG shall contain the enabling objectives developed to support the terminal objectives. The enabling objectives and their supporting data shall conform to the following requirements.

a. The enabling objectives shall be derived from the subtasks which support each task selected for training in the task analysis.

b. Each enabling objective shall have three parts: condition(s), performance, and standards.

c. The enabling objectives shall be sequenced in the best order for learning and shall be labeled with lower case letters, beginning with "a."

d. The type of learning represented by each enabling objective associated with a cognitive terminal objective shall be indicated in the appropriate column of Part II of the CDG using the following labels:

1) An enabling objective requiring the student to recall specific and general information, recall a pattern, sequence, or condition, or require the process of remembering, shall be labeled "K," for "Knowledge."

2) An enabling objective requiring the student to know how and why a procedure or action should be performed (i.e., describing function and fact), shall be labeled "C," for "Comprehension."

3) An enabling objective requiring the use of ideas, rules, procedures, methods, theories, and concepts in appropriate situations shall be labeled "AP," for "Application."

4) An enabling objective requiring the separating of a unit, such as a problem, policy, directive, technical material, schematic, or flow diagram, into its parts and showing the relationship between the parts, shall be labeled "AN," for "Analysis."

5) An enabling objective requiring putting elements together to form a whole, make a pattern, or form an approach, shall be labeled "S," for "Synthesis."

6) An enabling objective requiring a judgement or appraisal as to the value, or extent, to which materials or methods satisfy recognized criteria, shall be labeled "E," for "Evaluation."

e. In the case of enabling objectives supporting a performance terminal objective, at least one of the enabling objectives shall also reflect a performance requirement.

10.3.2.4 Content Outline. This section of Part II of the CDG shall contain an outline of the content to be taught for each terminal and enabling objective. This section shall meet the following requirements:

a. The content shall be organized into logical training segments, and the segments shall be identified in the technical content outline.

b. The training segments appearing in the technical content outline shall be organized in a logical way that best supports training.

10.3.2.5 Instructional Methods and Media. This section of Part II of the CDG shall contain an instructional method and supporting media for attaining each terminal objective and each enabling objective. Selection of methods and media shall be based on:

a. Type of learning to be supported.

b. Ability to simulate actual job performance conditions and requirements.

c. Variety of media or delivery systems needed to maintain an interactive learning environment.

d. Variety of situations which may be encountered on the job.

e. Other factors, such as cost, maintainability, ease of operation, and transportability.

10.3.2.6 Tests. This section of Part II of the CDG shall contain an indicator for the test type appropriate for each terminal objective and enabling objective. Selection of test type shall be consistent with the type of learning associated with each objective. At least one sample test item shall be developed for each terminal objective and its enabling objectives. These shall be labeled with a number. The items shall be referenced by number in the tests section. The developed test items shall be attached to the CDG.

10.3.2.7 Notes. This section of Part II of the CDG shall provide guidance, notes, and references for developing the courseware. References to technical manuals and other written documentation shall be stated at the paragraph level, at a minimum.

10.3.3 An example of Part III is shown in figure 6-2. Part III shall contain the following:

10.3.3.1 Cross Reference Matrix. The Cross Reference Matrix shall trace between the training outcomes, the tasks selected for training in the Task and Skills Analysis, and the terminal objectives. The

Cross Reference Matrix shall be comprised of four columns with the following information included:

a. In column 1, the training outcomes developed for Part II of the CDG shall be recorded.

b. In column 2, the task numbers from the Task and Skills Analysis which are associated with each training outcome shall be recorded.

c. In column 3, the terminal objective number that is associated with each task selected for training shall be recorded.

d. In column 4, the letter label for each training outcome as indicated in Part II of the CDG shall be recorded.

DID 6, FIGURE 1. SAMPLE COURSE DESIGN GUIDE, PART II
COURSE DESIGN

Course Number: 40265
Course Title: LOW LEVEL WINDSHEAR ALERT SYSTEM (LLWAS) FA9960

Block/Module Number:
Block/Module Title:

Page B1
Date

B. TRAINING OUTCOME: *Given a Low Level Windshear Alert System (LLWAS) with a malfunction, the Manufacturer's Instruction Book (MIB), appropriate test equipment and diagnostics tapes, the student will be able to restore the system to normal operation in accordance with (IAW) MIB T.I.-8690-1.*

EST. TIME (HRS.)	TERMINAL OBJECTIVES AND ENABLING OBJECTIVES	TYPE OF LEARNING	TEST TYPE	TECHNICAL CONTENT OUTLINE	INSTRUCTIONAL STRATEGY & MEDIA	DEVELOPMENTAL NOTES
				SYSTEM OPERATION		
2	1. Given the block diagram of the central station memory backup power supply, the student will analyze the operational characteristics IAW MIB T.I.-8690-1.	CG	W	1. Central Station Memory Backup Power Supply	Lecture/Discussion Text Transparencies Equipment Modules Questioning	Include glossary of common terms and definitions
	a. Given the block diagram of the central station memory backup power supply, the student will identify the function and purpose of the central station memory backup power supply IAW MIB T.I.-8690-1.	K	W 1	a. Function and Purpose Converting Line Voltages to Necessary dc Voltages Supplying ± 15 Volts, 10 Volts, 5 Volts		
	b. Given the block diagram of the central station memory backup power supply, the student will identify the inputs and outputs IAW MIB T.I.-8690-1.	K	W 2	b. Power Supply Interface Voltage Inputs Voltage Outputs		Diagrams of Inputs/Outputs Illustrate voltage paths
	c. Given the block diagram of the central station memory backup power supply, the student will trace the voltage path IAW the MIB T.I.-8690-1.	AN	W 3	c. Functional Block Diagram of Power Supply Description of Components Voltage Path		MIB Sections 4, 5, 6
7.	3. Given an operating LLWAS central station, the student will perform the normal system performance measurements IAW MIB T.I.-8690-1.	P	P	3. Central Station Laboratory	Demonstration/ Performance	Illustrate Voltage Levels Illustrate Signal Levels Safety Precautions
	a. Given an operating central station master controller and modem, the student will measure the voltage levels during "scan" and "down" and test the unit in test mode IAW MIB T.I.-8690-1.	P	P 4	a. Master Controller and Modem Voltage Level Measurements Scan Down Test Mode	Laboratory Actual Equipment Individualized Instruction	
	b. Given an operating central station master radio and power supply, the student will measure voltage and signal levels and align the receiver IAW MIB T.I.-8690-1.	P	P 5	b. Master Radio and Power Supply Voltage Level Measurement Signal Level Measurement Receiver Tuning		
	c. Given an operating LLWAS, the student will check the system operation by varying system parameters using the CRT and keyboard IAW MIB T.I.-8690-1.	P	P 6	c. CRT/Keyboard Vary System Parameters Gust Threshold Windshear Threshold		
	d. Given an operating LLWAS central station, the student will measure the voltage levels of the memory backup power supply and the computer power supply IAW MIB T.I.-8690-1.	P	P 7	d. Power Supplies Measure Voltage Levels Memory Backup Power Supply, Computer Power Supply		

NOTE: For the purposes of this sample, all the instructional objectives which support the training outcome have not been shown.

DID 6, FIGURE 2. SAMPLE COURSE DESIGN GUIDE, PART III, CROSS REFERENCE MATRIX

Course Number: 40265	Block/Module Number: _____	Page B2
Course Title: Low Level Windshear Alert System (LLWAS) FA9980	Block/Module Title: _____	Date _____

COLUMN 1 TRAINING OUTCOME	COLUMN 2 TASK NUMBER	COLUMN 3 TERMINAL OBJECTIVE NUMBER	COLUMN 4 TRAINING OUTCOME
Given a Low Level Windshear Alert system, the student will be able to evaluate the CRT displays to determining program operation in accordance with (IAW) the Manufacturer's Instruction Book (MIB) T.I.-8690-1.	1.1.1		A
	1.1.2		A
	1.1.3		A
	1.1.4		A
	1.1.5		A
	1.1.6		A
Given a Low Level Windshear Alert System and the MIB, the student will be able to perform preventive (periodic) maintenance procedures IAW Sections 4, 5, and 6 of the MIB T.I.-8690-1.	1.2.1		C
	1.2.2		
Given a Low Level Windshear Alert System with a malfunction, the MIB, appropriate test equipment and diagnostic tapes, the student will be able to restor the system to normal IAW at the current FAA standards and tolerance MIB T.I.-8690-1.	1.3.1		B
	1.3.2		B

Note: For the purposes of this sample, all the tasks which support each training outcome have not been shown.

DATA ITEM DESCRIPTION (DID) -7

1. Title:

Course Schedule

3. Description/Purpose:

This DID establishes the minimum requirements for the content of the contractor's course schedule. The course schedule documents the:

a. Starting and ending dates of the course.

b. Time allocations for major topics and lessons in the course.

c. Major course topics and lessons, arranged in chronological order.

d. Points at which tests are administered.

e. Number of instructors.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the Course Schedule.

7.2 This DID is applicable to all contract training development and delivery efforts.

10. Preparation Instructions:

10.1 **Reference Documents.** The Course Schedule shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 **Format.** The Course Schedule shall be prepared in accordance with the following format requirements:

10.2.1 A camera-ready or master reproducible copy of the Course Schedule shall be delivered on 8.5" x 11" bond paper. An electronic version shall be

delivered, if so specified by the contract. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 The Course Schedule shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.3 If the schedule for more than one class appears in the Course Schedule, a Table of Contents page shall follow the cover sheet, specifying the page numbers on which each class schedule appears.

10.2.4 If the schedule for more than one class appears in the Course Schedule, each class shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The Course Schedule shall be prepared in accordance with the descriptions provided below:

10.3.1 **Grid.** The Course Schedule shall be set up as a grid with the days of the week on one axis and the daily hours or periods per day on the other axis. If the contract specifies the day of the week on which the course begins, the week block shall begin with that day. Figures 7-1 and 7-2 of this DID provide examples of the specified arrangement.

10.3.2 **Other Information.** The following information shall be indicated on the Course Schedule:

a. Major course topics, as stated in the technical content outline of Part II of the CDG, and as shown in Figure 1 of this DID.

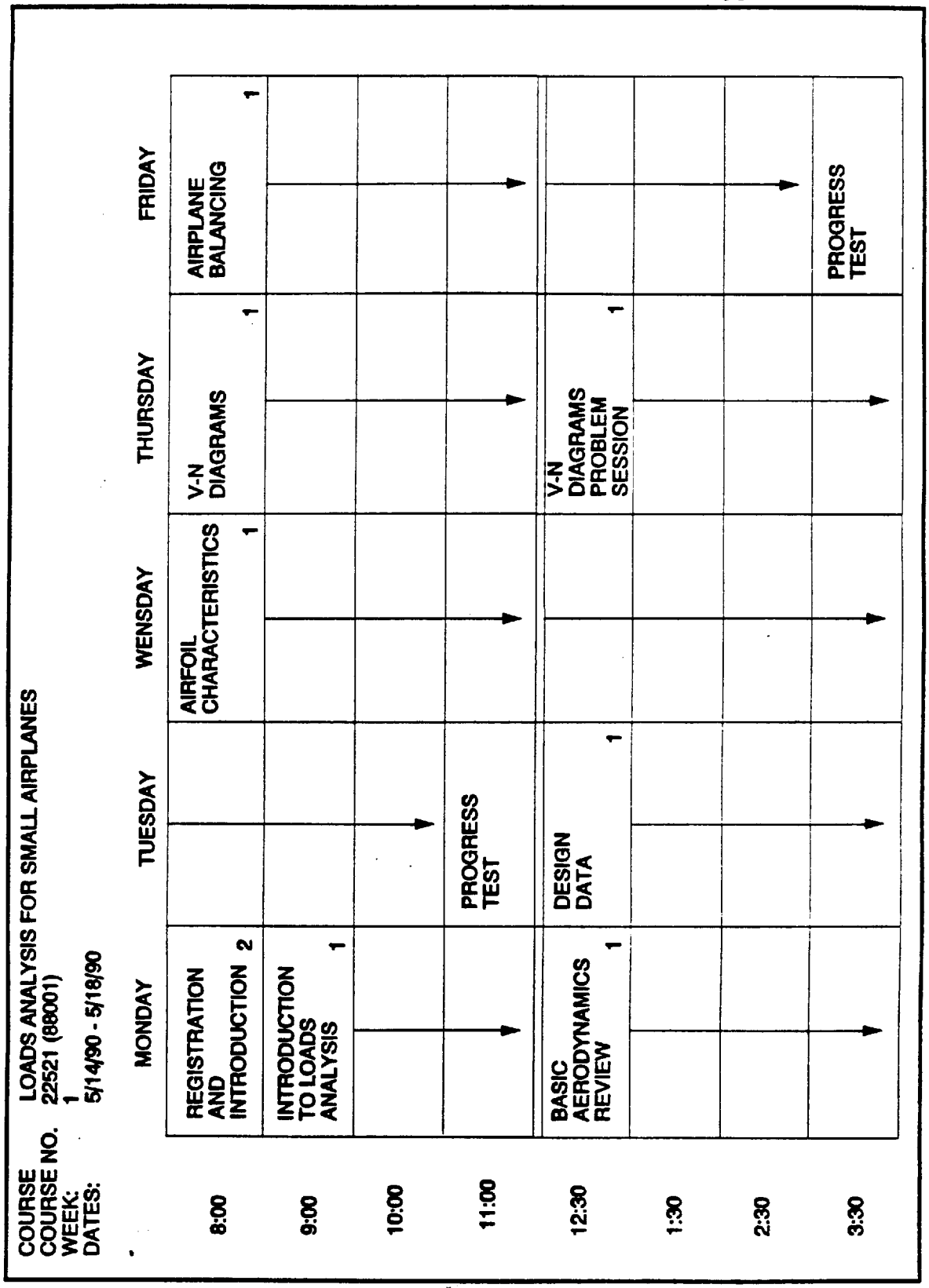
b. Estimated time, as stated in Part II of the CDG, for each course topic.

c. Periods devoted to performance exercises.

d. Type of test(s) associated with a specific course topic block.

e. Number of instructors for each instructional segment. This number shall appear in the lower right corner of the block.

DID 7, FIGURE 1. SAMPLE COURSE SCHEDULE WITH MAJOR COURSE TOPICS



DID 7, FIGURE 2. SAMPLE COURSE SCHEDULE WITH LESSON TITLES

COURSE ARTS IIIE SYSTEM
WEEK: 1
DATES: 8/7/90 - 8/13/90

	FIRST PERIOD	SECOND PERIOD	THIRD PERIOD	FOURTH PERIOD
TUESDAY	ADMINISTRATION	ATRS IIIE System Introduction	ATRS IIIE System Introduction Laboratory Group 1	ATRS IIIE System Introduction Laboratory Group 2
WEDNESDAY	VMEbus Specification and Data Transfer Bus (DTB)	VMEbus Specification and Data Transfer Bus (DTB) DTB Arbitration Bus	DTB Arbitration Bus Priority Interrupt Bus	Priority Interrupt Bus Utility Bus MC68010 Microprocessor Architecture
THURSDAY	MC68010 Microprocessor Data Organization MC68010 Addressing Capabilities	MC68010 Addressing Capabilities MC68010 Instruction Set	MC68010 Instruction Set MC68010 Exception Processing	MC68010 Exception Processing Download Functional Operation
FRIDAY	Download Functional Operation Download Procedure	Download Procedure Download Procedure Lab Group 1	Download Procedure Lab Group 2 Progress Test One	Progress Test One FDAD Functional Sections: Console, DSU, PEC
MONDAY	FDAD External and Internal Interfaces FDAD Operator Assemblies, Modes, and Operation	FDAD Operator Assemblies, Modes, and Operation SDU Deflection Correction	SDU Deflection Amplifiers SDU Video Amplifier	SDU Assemblies and Power Supplies SDC Central Processing Unit: Functional Operation

DATA ITEM DESCRIPTION (DID) -8

1. Title:

Student Achievement Tests

3. Description/Purpose:

This DID establishes the minimum requirements for the content and format of contractor-provided, criterion-referenced student achievement tests. This DID contains preparation guidance for both student and instructor versions of the test(s).

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of Student Achievement Tests.

7.2 This DID is applicable to all contract training development efforts, other than computer-based instruction (CBI).

7.3 See DID-17 for guidance on the preparation of CBI tests for all FAA organizations.

10. Preparation Instructions:

10.1 **Reference Documents.** Student Achievement Tests shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 **Format.** The Student Achievement Tests shall be prepared in accordance with the following format requirements:

10.2.1 Camera-ready or master reproducible copies of Student Achievement Tests shall be delivered on 8.5" x 11" bond paper. Electronic versions of the Student Achievement Tests shall be delivered, if so specified in the contract. Foldout pages may be used as required. All pages shall be numbered at the bottom center. The submission date of the test shall be placed next to each page number.

10.2.2 Each Student Achievement Test shall have a cover sheet displaying the following information:

a. Document title which identifies the type of test (pretest, progress test, or post-test), course title, and test user (student or instructor).

b. Course Identification number.

c. Label or number of the test, which shall be consistent with the labeling system of the FAA organization for which the test has been developed.

d. A statement as to subject matter area of the test and the associated lesson title(s) and number(s).

e. Contract number.

f. Contractor name and address.

g. Submission date.

10.2.3 For the student version of the Student Achievement Test, a Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents for the student version of a post-test shall include:

a. Student Achievement Test.

b. Alternate Test.

10.2.4 For the instructor version of the Student Achievement Test, a Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents for the instructor version of the Student Achievement Test shall include, in the following order:

a. Instructions.

b. Answer Key.

c. Student Achievement Test.

d. Alternate Test.

e. Alternate Test Answer Key.

10.2.5 Each of the sections named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. Student Achievement Tests shall be prepared in accordance with the descriptions provided below:

10.3.1 **Student Achievement Test.** Each Student Achievement Test shall include:

10.3.1.1 **Test Instructions.** Each Student Achievement Test shall include clear, concise, written test instructions which include the following information:

a. Time allowance for completing test.

b. List of allowed reference materials, if appropriate.

c. Required manner for indicating response.

d. Method for grading test, if appropriate.

e. A statement as to contribution of the test score to the student's final grade for the course.

f. Specification of assistance to be made available for the student.

g. For performance tests include the following:

1) Description of the simulated situation.

2) Tools and supplies to be used.

3) Student Activities.

4) Explanation of performance recording and scoring.

5) Statement as to the type of performance being evaluated (process, product, or both).

10.3.1.2 **Test Items on Student Version.** Each student version of the Student Achievement Test shall include test items which correspond to the terminal and enabling objectives specified in the CDG. The number of test items shall be sufficient to adequately measure student mastery of each

training outcome, terminal objective, and enabling objective. Allowable types of items include:

a. For written tests:

1) Multiple choice.

2) True-false.

3) Completion/Short answer.

4) Matching.

b. For performance tests:

1) Demonstrations of actual, and observable, performance.

2) Performance checklists.

10.3.1.3 Alternate Written Test. An alternate written test shall be provided. The contents of the alternate written test shall be as follows:

a. Test instructions as specified in 10.3.1.1.

b. Test items such that each test item on the alternate test and its corresponding original test item shall measure the same objective. However, the alternate test item shall not be identical to that of the original test item. Each test item and its alternate shall be identified by the same label. For example, if the original test item is labeled "1," its alternate form shall also be labeled "1."

10.3.2 Instructor Version. The instructor version of the student achievement test shall contain the following:

10.3.2.1 Instructor Instructions. The instructor version of the Student Achievement Test shall include instructions to the instructor directing him/her in the procedure for test administration. The instructions shall include:

a. Heading, with the course number and title, lesson title, and the type of test (pretest, progress test, or post-test).

b. Description of student activities during the test.

c. Instructor responsibilities, such as:

1) Ensuring satisfactory test area conditions (for example, minimal distractions; adequate working space; and sufficient materials).

2) Ensuring the simulator/test equipment is operable for performance tests.

d. Emergency procedures for accidents, illnesses, equipment failure, power failure, severe weather, and fire drills.

10.3.2.2 Answer Key. The instructor version of the Student Achievement Test shall include an answer key which contains the following items:

a. Correct answer for each test item in the order in which the items appear on the student test copy.

b. Acceptable responses and acceptable variations of the answer for completion/short answer test items.

c. Checklist of the procedures to be performed by the student for performance tests, sequenced in the order in which the procedures should be performed. Standardized checklists shall be developed to assist the instructor in assessing mastery of performance behaviors. Sufficient detail shall be provided to enable an instructor to make "go/no-go" decisions and to determine whether further training is required.

d. Directions for recording and scoring student test performances.

10.3.2.3 Student Achievement Test. Each instructor version of the Student Achievement Test shall include all test items appearing on the student version of the test. Each test item shall have the alphanumeric label, from Part II of the CDG, for the corresponding terminal or enabling objective in parentheses next to the test item.

10.3.2.4 Alternate Test. A copy of the alternate test shall be provide. Each alternate test item shall be labeled in accordance with 10.3.1.3 above.

10.3.2.5 Alternate Test Key. The alternate test answer key shall be provided in accordance with 10.3.2.2 above.

DATA ITEM DESCRIPTION (DID) -9

1. Title:

Lesson Plan

3. Description/Purpose:

This DID establishes the minimum requirements for the content of contractor-developed Lesson Plans. For each lesson or practice exercise of a course, the associated Lesson Plan documents the:

a. Course number, course title, preparation date, lesson duration, lesson title, exams and workshop material, other student support material, lesson overview, references, visuals, handouts, and other pertinent information.

b. Subject outline, which includes the introduction, body, and summary sections.

c. Instructional materials, overheads, carousel slide positions, notes, and response items to be used during the lesson.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of Lesson Plans.

7.2 This DID is applicable to all contract training efforts for developing instructor-presented training (IPT).

10. Preparation Instructions:

10.1 Reference Documents. The Lesson Plans shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 Format. The Lesson Plans shall be prepared in accordance with the following format requirements:

10.2.1 A camera-ready or master reproducible copy of the Lesson Plan shall be delivered on 8.5" x 11" bond paper. An electronic version shall be delivered, if so specified by the contract. The cover page of the Lesson Plan shall not be numbered. All other pages of the Lesson Plan shall be numbered on a line in the page heading. Lesson Plans shall be constructed using double spacing.

10.2.2 The Lesson Plan shall have a cover sheet displaying the following information. An example of a cover sheet for a Lesson Plan appears in Figure 9-1 of this DID.

a. Course number, as supplied by the FAA.

b. Course title, as specified in the CDG.

c. Lesson plan number, which shall be consistent with the labeling system of the FAA organization for which the lesson plan is developed.

d. Lesson title, which shall be consistent with the technical content outline of the CDG.

e. Date on which the instructor lesson plan is prepared.

f. Duration of the lesson in hours and minutes.

g. Exams and/or performance exercise used within the lesson.

h. Reference list, which shall include source materials from which the instructor shall gather information to support the lesson objectives. (Identify each document by title, page, paragraph number, and publication date, as applicable).

i. Visuals, including overhead transparencies, listed by label/number which shall be consistent with the labeling system of the FAA organization for which the lessons are developed.

j. Handouts, listed by label/number which shall be consistent with the labeling system of the FAA organization for which the lessons are developed.

k. Other pertinent information; for example, advisory circulars or a change of status.

l. Document number (to be left blank).

m. Developer's name and address.

n. Name of the FAA COTR.

10.2.3 An example of a Lesson Plan appears in Figure 9-2. The Lesson Plan page shall consist of:

a. A heading area at the top of the page.

b. Four columns labeled, with upper case letters, as follows:

1) AIDS.

2) POS.

3) SUBJECT OUTLINE.

4) NOTES.

10.2.4 Answers, and references for answers, for all study questions and self-test items appearing in the Student Guide and Student Workbook shall be attached to the end of their corresponding Lesson Plan.

10.3 Content Requirements. Each Lesson Plan shall be prepared in accordance with the descriptions provided below:

10.3.1 **Heading.** There shall be two types of headings on Lesson Plan pages:

a. The first page of the Lesson Plan shall contain the following information:

1) Lesson Plan title.

2) Course title and number.

3) Lesson number.

4) Preparation date.

5) Subject covered in lesson.

6) Document number, if it has been assigned; if the number has not been assigned, this area shall be left blank.

7) Lesson duration.

8) Page number.

b. Subsequent pages of the Lesson Plan shall contain the following information:

1) Document number if it has been assigned; if the number has not been assigned, this area shall be left blank.

2) Lesson number.

3) Preparation date.

4) Page number.

10.3.2 **AIDS.** References to the appropriate instructional materials to be used in conjunction with the information in the subject outline shall be placed in the AIDS column. References shall be consistent with the labeling system of the FAA organization for which the lessons are developed. Appropriate instructional materials shall include, but not be limited to, all:

a. Visual aids.

b. Audiovisual aids.

c. Handouts.

d. Reference documents, including the Student Guide, the Student Workbook, and all supplemental materials.

e. Tests.

f. Response items.

10.3.3 **POS.** The POS column shall be left blank. It is for FAA use only and will eventually contain the slide position number of the carousel.

10.3.4 **SUBJECT OUTLINE.** The subject outline shall be placed in the column labeled SUBJECT OUTLINE. The

subject outline shall contain the following information:

a. For non-performance exercise lesson plans:

1) Introduction.

2) Body of lesson.

3) Summary.

4) Response Items.

b. For performance exercise lesson plans, which shall correspond to the job sheets in the Student Guide, described in Student Materials (DID-9):

1) Time allocation for preparation of materials or equipment for the performance of the exercise.

2) Steps for instructor demonstration of the activity.

3) Step-by-step procedures for the students to follow when performing the activity.

4) Explanation of how the performance exercise relates to the lesson.

5) Specification of safety procedures and precautions related to the performance exercise.

6) Performance evaluation criteria.

10.3.4.1 The Introduction shall be the first section of the subject outline. The Introduction shall be written such that it will promote student interest in the lesson topic. When supplemental training is being developed, the introduction shall establish a bridge between management and technical procedures and processes as currently performed and how they will be performed as the result of new equipment or workforce changes. Relevant knowledge of students in relation to the current work environment shall be recalled to help the students learn new knowledge and skills. At a minimum, the Introduction shall include the following:

a. Review of the knowledge and skills from previous lessons which tie in with the current lesson.

b. Overview of the learning activities and organization of the lesson.

c. Examples of real world applications of the lesson content.

d. A statement as to the benefits of the lesson.

e. Objective(s) of the lesson, as specified in the CDG.

10.3.4.2 The Body of the lesson shall be the second section of the subject outline. The Body of the lesson shall communicate the key points of the lesson. The body of the lesson shall be task based and shall build from the known to the unknown, simple to complex,and concrete to abstract. At a minimum, the body shall include the following:

a. Expansion of the information contained in Part II of CDG with sufficient detail to ensure achievement of the terminal and enabling learning objectives.

b. Student-instructor interaction, such as practice and participation activities.

c. Exact wording of response items, blocked in by horizontal lines above and below.

d. Interim summary, which recaps the key points of the body in outline form (approximately one interim summary for each 2-hour class session).

e. Titles of handouts and/or other reference material.

f. Black and white depiction (this may be a photograph, if specified in the contract) of all slides and transparencies, appropriately placed in the lesson plan, and blocked in by horizontal lines above and below. This shall be accomplished with print if the slide is strictly text.

10.3.4.3 The Summary section shall follow the Body of the lesson in the subject outline. The Summary shall present a review of the objectives and the key points of the Body of the lesson. At a minimum, the summary shall include:

a. Review of the main points of the lesson and the lesson objectives.

b. Evaluation, including instructions for administering and grading an end-of-lesson (progress) test. The contractor shall provide an end-of-lesson test for each lesson. Student Achievement Tests (DID-8) specifies the content and format for progress tests.

c. Assignment, including a brief preview of the next lesson and/or an assignment which shall prepare students for upcoming material. If study questions are used in the assignment, the answers shall be provided and shall be attached to the end of the lesson plan they support.

10.3.4.4 Response Items shall be placed throughout the Lesson Plan at points where they are best suited during the lesson. There shall be response items for all sections of the Lesson Plan. Use of response items shall include, but not be limited to, learning reinforcement, summarization, and drawing attention to the material. Types of response items include:

a. Oral questions, such as:

1) Rhetorical questions directed to the entire group of students to stimulate covert group response. No verbal response is expected.

2) Factual questions requiring the student(s) to give "when," "where," and "what" responses.

3) Leading questions used to assist the student(s) in thinking through to the answer. When a student is seeking the answer, the instructor may ask another question to direct attention to information known but not being used.

4) Problem questions which challenge the student(s) to apply knowledge to specific problems.

b. Written questions.

c. Role playing.

d. Work sheets.

e. Push button response items, known as responder items, if specified by the contract.

10.3.5 **NOTES.** All the instructor activities designed to enhance the instruction outlined in the presentation shall be placed in the NOTES column. The information in the NOTES column shall be placed at the point(s) in the Lesson Plan where it will provide the greatest benefit to the instructor. The following types of information shall be recorded in the NOTES column:

a. References to governmental and industry documents pertaining to the lesson.

b. Notes from the developer to the instructor.

c. Answers to response items, placed opposite the items to which they pertain.

d. Specification of how optional material shall be used.

e. Other pertinent information.

10.3.5.1 Whenever an instructional aid is identified in the AIDS column, the NOTES column shall contain corresponding information, including the title (or description) of the instructional aid and the associated instructor activities.

DID 9, FIGURE 1. SAMPLE LESSON PLAN COVER SHEET

COURSE NO. AND NAME 50255 MODEL-1 AFSS SUPERVISOR TRAINING	
LESSON TITLE FLIGHT SERVICE AUTOMATION SYSTEM (FSAS) COMMUNICATION PROCESS, F-12-11	
DATE REQUIRED DECEMBER 1985	**DURATION** 4+00
EXAMS AND /OR PERFORMANCE EXERCISE MATERIAL END-OF-LESSON TEST, F-12-11	
REFERENCE LIST SUPERVISOR'S SUPPLEMENT	
VISUALS F-12-11-1 AND F-12-11-6 THROUGH F-12-11-10	
HANDOUTS FW-12-2 SUPERVISOR'S SUPPLEMENT	
OTHER PERTINENT INFORMATION END OF LESSON TEST AND PERTINENT SLIDES ARE INCLUDED IN THE STUDENT WORKBOOK	
DOCUMENT NO.	
DEVELOPER'S NAME AND ADDRESS ABC TRAINING 5000 C ST., N.W. WASHINGTON, D.C. 20001	**FAA COTR** JOHN W. JONES

DID 9, FIGURE 2. SAMPLE LESSON PLAN

Lesson Plan Title

Course _____ Lesson No. _____ Date _____

Subject _____

Document No. _____ Duration _____ Page _____

AIDS	POS	SUBJECT OUTLINE	NOTES
Use this column for: Training Aids (use codes)	List slide position no. in carousel in this column	Use this column for: I. Introduction A. Review/Tie-in 1. Give a brief review of past lesson(s), background knowledge, or skills that are important to this lesson. 2. Relate new learning to the job, and prepare students to learn new knowledge and skills. 3. Transition from known to unknown. B. Define key terms and introduce new acronyms.	Use this column for: 1. References 2. Descriptions of visuals 3. Developer-to-instructor notes 4. Answers to questions 5. Instructor's personal teaching information 6. Optional material

Lesson Plan Continuation

Document No. _____ Duration _____ Page _____

AIDS	POS	SUBJECT OUTLINE	NOTES
		C. Overview 1. Give an overview of the lesson. Explain what is to be learned, and how it will be accomplished. 2. Mention the use of lab exercises and testing, as appropriate. D. Motivation 1. State the benefits of learning the new knowledge and skills. 2. Create interest and prepare students to learn.	Include any notes for the instructor.

Lesson Plan Continuation

Document No. _____ Duration _____ Page _____

AIDS	POS	SUBJECT OUTLINE	NOTES
		E. Objectives 1. Explain the terminal and enabling objectives for the lesson. 2. Make students aware of what they will know and be able to do upon completion of the lesson.	Use a visual which lists the objectives.
		II. Body (use detailed outline format) A. Body of lesson should convey information in a logical learning sequence: - Simple to complex, - Known to unknown, - Job performance sequence. B. Teach to the objectives. C. Specify safety precautions.	Provide content information references. Use additional visuals, as required.

Lesson Plan Continuation

Document No. _____ Duration _____ Page _____

AIDS	POS	SUBJECT OUTLINE	NOTES
		III. Summary A. Review the objectives, as required. B. Review key terms and definitions. C. Review main points. D. Review safety precautions. E. Provide review questions for reinforcement of content. Discuss answers as a group.	Provide guidance on how to connect the review.
		IV. Practice Exercises A. Explain any lab or other practical application exercises that are part of lesson. B. Brief students on any safety precautions and procedures to be followed for hands-on performance.	List any lab or practice application guidance.

DID 9-13

Lesson Plan Continuation

Document No. _____ Duration _____ Page _____

AIDS	POS	SUBJECT OUTLINE	NOTES
		V. Conduct End-of-Lesson Tests A. Make sure students understand the test directions and test conditions. B. After testing and scoring have been complete, review written and performance test items. Make sure students understand their mistakes. C. Provide additional training, as required. VI. Present any assignments for the following lesson and preview the next learning activity.	Make answer keys and performance checklists part of lesson plan.

DATA ITEM DESCRIPTION (DID) -10

1. Title:

Student Materials

3. Description/Purpose:

This DID specifies the minimum requirements for the content of student materials developed to support training. Student Materials shall include:

a. Student guide.

b. Student workbook.

c. Supplementary materials.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the student materials specified in paragraph 10.3 of this DID.

7.2 This DID is applicable to all contract training development efforts.

10. Preparation Instructions:

10.1 **Reference Documents.** The student materials shall be prepared in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 **Format.** Student materials shall be prepared in accordance with the following format requirements:

10.2.1 **Student Guide.** A camera-ready or master reproducible copy of the Student Guide shall be delivered on 8.5" x 11" bond paper. An electronic version shall be delivered, if so specified by the contract. Foldout pages may be used as required. All pages shall be numbered at the bottom center. The materials in the Student Guide shall be separated into logical segments; for example, by lesson, topic, or day of class. Separation of

logical segments shall be made with tabs, dividers, or colored paper. The Student Guide contents shall be labeled/numbered in a manner which is consistent with the labeling system of the FAA organization for which the guide is developed. The cover of the Student Guide shall be labeled with the title(s) of the lessons it supports.

10.2.1.1 The Student Guide shall have a cover sheet displaying the following information:

a. Heading identifying the lesson title(s) and number(s) covered in the guide.

b. Course title and number the guide supports.

c. Preparation date of the guide.

d. Statement that the document is for training purposes only.

10.2.1.2 The Student Guide shall have a Table of Contents following the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. References.

b. Administrative information.

c. Introduction.

d. Information sheets.

e. Assignment sheets.

10.2.2 **Student Workbook.** A camera-ready copy of the Student Workbook shall be delivered on 8.5" x 11" bond paper. An electronic version shall be delivered, if so specified by the contract. Foldout pages may be used as required. All pages shall be numbered at the bottom center. The Student workbook shall be organized by lesson, with each lesson separated from other lessons by tabs, dividers, or colored paper. The Student Workbook contents shall be labeled/numbered in a manner which is consistent with the labeling system of the FAA organization for which the guide is developed. The cover of the Student Workbook

shall be labeled with the title(s) of the lessons it supports.

10.2.2.1 The Student Workbook shall have a cover sheet displaying the following information:

a. Heading identifying the lesson title(s) and number(s) covered in the guide.

b. Course title and number the guide supports.

c. Preparation date of the guide.

d. Statement that the document is for training purposes only.

10.2.2.2 The Student Workbook shall have a Table of Contents following the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. References.

b. Instructions for workbook use.

c. For each lesson covered by the workbook:

1) Learning activities.

2) Job sheets to support the learning activities.

10.2.3 Each section of the student materials described above shall be initiated on a separate page displaying a centered all-caps heading.

10.2.4 **Supplementary Materials.** Supplementary materials shall be bound separate from other materials following the contractor's commercial practice. All supplementary materials shall be labeled "For Student Use Only."

10.3 **Content Requirements.** Student materials shall be prepared in accordance with the descriptions provided below:

10.3.1 **Student Guide.** The Student Guide organization and contents shall be as follows:

10.3.1.1 **References.** The reference page shall list all:

a. Training outcome(s) from the CDG covered by the Student Guide.

b. Reference materials required for the course.

10.3.1.2 Administrative Information. The administrative information section of the Student Guide shall contain, but not be limited to:

a. Course schedule in the format specified in Course Schedule (DID-7).

b. Any safety precautions to be observed during the course.

c. Guidelines for using the material in the Student Guide.

d. Orientation information which includes a list of lodging facilities, restaurants, and transportation services for students.

10.3.1.3 Introduction. The introduction for each lesson shall list all objectives for the lesson.

10.3.1.4 Information Sheets. Information sheets shall be included to aid the student by supporting important information contained in the instruction and presenting information from documents which are not readily available to the students. Each information sheet shall have a heading which identifies the lesson to which it pertains. Each type of information presented on an information sheet shall be titled. Information sheets shall be sequenced to correspond with the sequence in which the information is presented. All visuals included on an information sheet shall have conventional labeling and format (e.g, call-outs), and shall be clear and uncluttered. All call-outs on a visual shall be explained in the accompanying text. When text and a visual appear on the same information sheet, the text shall be placed to the left or above the visual, or in the case of double-sided printed pages, the text may appear on the left-hand page. Information sheets may include the following types of data:

a. Narrative descriptions, which shall be written at the appropriate reading level for the class.

b. Diagrams, which shall be labeled in accordance with documents referenced in the contract.

c. Sketches.

d. Charts, which shall be labeled in accordance with documents referenced in the contract and shall be drawn so as to convey the greatest amount of information in the most accurate way.

e. Graphs, which shall be labeled in accordance with documents referenced in the contract and shall be drawn so as to convey the greatest amount of information in the most accurate way.

f. Pictures, which shall be printed in such a way as to convey the fullest amount of information possible.

h. Tables, which shall be labeled in accordance with documents referenced in the contract and shall be drawn so as to convey the greatest amount of information in the most accurate way.

i. Flowcharts, which shall be labeled in accordance with documents referenced in the contract.

j. Excerpts from or references to other documents or original material prepared by the contractor.

10.3.1.5 Assignment Sheets. An assignment sheet shall be placed at the end of each lesson or class day segment. The assignment sheet shall support the instruction by preparing the students for upcoming material. Assignment sheets shall contain the following:

a. Introduction, which states the purpose or the scope of the assignment.

b. Study assignment, which provides instructions for completing the assignment and identifies the paragraphs, pages, and publications assigned for reading. Study assignments shall be:

1) Reasonable in length and not require more than two hours to complete.

2) Sequenced in the best learning order.

c. Study questions, which are thought-provoking and related to the assignment. Study questions shall:

1) Require decisions similar to those made on the job.

2) Measure the student's accomplishment of the objectives.

10.3.2 Student Workbook. The Student Workbook shall present learning activities which are applications of the principles learned in the classroom to practical, job-relevant situations. The Student Workbook shall contain:

10.3.2.1 Reference Page. The reference page(s) shall list all:

a. Training outcome(s) from the CDG covered by the Student Guide.

b. Reference materials required for the course.

c. Reference materials needed to complete any learning activity included in the workbook.

10.3.2.2 Learning Activities. Learning activities shall consist of a list of questions and/or one or more projects to complete. The learning activities shall require the student to use only the reference material available during the course and the knowledge acquired through the instruction to complete the activity. Each learning activity shall include the:

a. Topic title.

b. Terminal Objective(s) addressed by the activity.

c. Enabling Objective(s) addressed by the activity.

D. Activity.

10.3.2.3 Job Sheets. Job sheets shall support performance exercises in the lesson. Each performance exercise shall require at least one job sheet. An example of a job sheet appears in Figure 10-1 of this DID. Each job sheet shall include:

a. Performance exercise title.

b. Time of performance.

c. Job sheet number.

d. Introduction, which gives a brief statement of the topic, purpose, scope, and value of the performance exercise and a suggested completion time.

e. Terminal and enabling objective(s), which specify what the student will accomplish through completion of the performance exercise.

f. References, which identify the publications referenced in the performance exercise.

g. List of all equipment, tools, and materials necessary for the performance exercise.

h. Precautions to be observed during the performance exercise, including personnel safety and equipment care.

i. Job steps for properly performing assigned tasks in a step-by-step manner; if the job steps contained in the technical documentation used in the course are sufficiently detailed, the applicable section and page shall be referenced rather than reproducing them as job steps.

j. Space for the instructor's initials and date, indicating satisfactory student performance of the job steps.

k. Self-test items, which provide questions on the performance exercise and are designed to measure student understanding of the procedures. The students shall be permitted to use information in the technical manual and the course materials, as appropriate, in solving the questions.

10.3.3 **Supplementary Materials.** Any necessary supplementary materials shall be provided to the student. Examples of supplementary materials may include, but are not limited to:

a. System or equipment publications.

b. Operator's manuals.

c. Computer documentation.

d. Schematics or block diagrams (a draft or final copy of a set of schematic and block diagrams, if prepared as a deliverable engineering item).

e. Books.

f. Periodicals.

g. Pamphlets.

h. Maps.

i. Photographs.

j. Reference manuals.

DID 10, FIGURE 1. SAMPLE JOB SHEET FORMAT

TITLE: TIME:

JOB SHEET NO:

INTRODUCTION:

OBJECTIVES:

REFERENCES:

EQUIPMENT AND MATERIALS:

PRECAUTIONS TO BE OBSERVED:

JOB STEPS:

Step 1.

Step 2.

Step 3.

NOTE: Have instructor verify procedure. Date: _____

Instructor initials:

Step 4.

Step 5.

NOTE: Have instructor verify procedure. Date: _____

Instructor initials:

SELF-TEST ITEMS:

1.

2.

DATA ITEM DESCRIPTION (DID) -16

1. Title:

CBI Lesson Specifications

3. Description/Purpose:

The CBI Lesson Specifications DID contains two parts. Part I documents the design of each computer-based instruction (CBI) lesson. Part II documents the hardware, authoring system, and conventions to be used to produce each lesson. This DID provides the transition from analysis to the design and production of draft CBI courseware. The CBI Lesson Specifications are prepared following the Course Design Guide (CDG).

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of CBI Lesson Specifications.

7.2 This DID is applicable to all contract training developments which will produce electronically-delivered instruction. The term computer-based instruction (CBI) shall include computer-based instruction, computer assisted or managed instruction, interactive videodisc (IVD), compact disc interactive (CD-I), and other advanced training technologies.

10. Prepararion Instructions:

10.1 Reference Documents. CBI Lesson Specifications shall be prepared in accordance with the documents referenced in the contract and to the approved Course Design Guide (CDG).

10.2 Format. CBI Lesson Specifications shall be prepared in accordance with the following format requirements:

10.2.1 Each CBI Lesson Specification shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages

may be used as required. All pages shall be numbered at the bottom center.

10.2.2 The CBI Lesson Specifications document shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s). (When more than one Lesson Specifications document must be provided because of the length of the course)

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

Part I

a. Introduction to the Course.

b. Course Prerequisites.

c. Course Organization.

d. Lesson Elements.

1) Lesson Introduction.

2) Lesson Objectives.

3) Lesson Flow.

4) Content (by Segment).

5) Graphics.

6) Lesson Summary.

e. Instructional Techniques.

1) Presentation.

2) Practice.

3) Branching.

4) Interactions.

5) Feedback.

6) Help Sequence.

f. Testing.

1) Pretest.

2) Progress Test.

3) Post-test.

g. Remediation.

h. Supporting Student Materials.

Part II

a. Presentation System/Hardware.

b. Authoring System Description.

c. Conventions.

d. Developer's Notes.

10.2.4 Each of the Lesson Specification segments named above shall be initiated on a separate page displaying a centered all-caps heading.

Part I organization and content shall be as follows:

10.3 **Content Requirements**. Each CBI Lesson Specification for a course shall be prepared in accordance with the descriptions provided below:

10.3.1 **Introduction to the Course.** This section shall provide a brief overview of the purpose and expected application of the course.

10.3.2 **Course Prerequisites.** This section shall list the necessary prerequisite experience/training which a student should have prior to taking the course.

10.3.3 Course Structure. Overall course structure shall be shown by means of a Course Flowchart. Figure 1 is an example of a Course Flowchart.

10.3.4 Lesson Elements. This section shall describe each aspect of the lesson: the objectives to be achieved, the content to be included, the lesson flow, and the tests associated with the lesson. The time estimate for each lesson shall be documented.

10.3.4.1 Lesson Introduction. This section shall provide a brief overview of the purpose and expected application of the lesson, and how it is related to other lessons in the course.

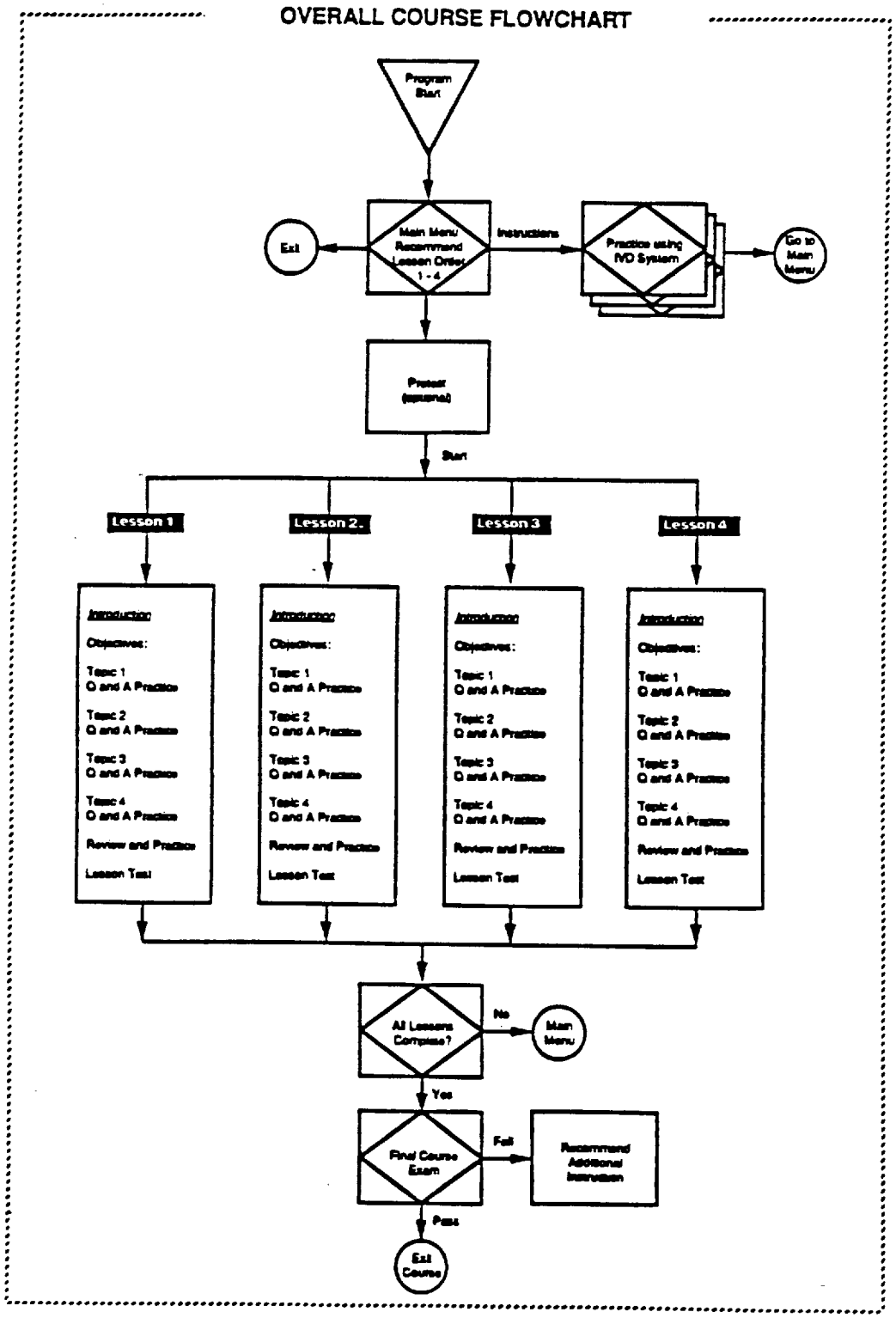


Figure 1: Example of Course Flowchart DID 16-5

10.3.4.2 Learning Objectives. This section lists the terminal objectives and their associated enabling objectives as they are specified in the Course Design Guide (CDG). This listing is as follows:

a. Each relevant terminal objective listed in optimum learning sequence.

b. The associated enabling objectives listed under the terminal objective from which they were derived and arranged in optimum learning sequence.

c. Each terminal and enabling objective shall be written in the three-part form prescribed in the CDG (conditions, performance, and standards).

d. All objectives shall be labeled in accordance with the instructions in the CDG.

10.3.4.3 Lesson Flow. This flowchart shall depict the details of the lesson design using standard flowchart procedures, to include the following:

a. The sequence of lesson segments. Each segment shall be labeled with the topic or content to be covered.

b. The location of all test events. Each event shall be labeled to indicate the type and content of the test.

c. Branching between lessons and within lessons.

10.3.4.4 Content (by Segment). A topical outline of each lesson shall be provided which relates knowledge and skill areas to the terminal and enabling objectives.

10.3.4.5 Graphics. (For non-IVD lessons; IVD lessons will require use of the Video Shot List DID.) All graphics intended to be part of a frame shall be described in sufficient detail (with references for source material wherever possible) so that the lesson author who will implement this Lesson Specification can accurately interpret the designer's intent.

10.3.4.6 Lesson Summary. A description of how the key points will be summarized and tied together shall be provided.

10.3.5 **Instructional Techniques.** This section shall describe the instructional techniques to be incorporated into the lesson to maximize the effectiveness of the training medium. These techniques include presentation, practice, branching, interaction, feedback, and help sequence.

10.3.5.1 **Presentation.** The presentation for each lesson shall be described. Presentation strategies for CBI include drill and practice, tutorial, case studies, and simulation. Presentation of instruction is based on the type of learning objective in accordance with the Course Design Guide (CDG).

10.3.5.2 **Practice.** Practice exercises shall permit the application of material learned in the earlier portion of the lesson. These exercises shall be designed to require decision-making and/or the application of procedures to solve realistic problems. This section shall describe the practice to be provided for each learning objective, and specify what cues, prompts, and memory aids shall be provided for the student.

10.3.5.3 **Branching.** This section shall describe how branching will be used within the lesson. All branching points and the basis for branching shall be described.

10.3.5.4 **Interactions.** This section shall describe how interactions between the student and the training system will be used within the lesson. The description shall include the purpose of each interaction and the means by which it is to be accomplished--for example, touch screen or keystrokes.

10.3.5.5 **Feedback.** This section shall describe how feedback will be provided to responses made by the student. Feedback may be given in an auditory mode or in the form of text and/or graphics as appropriate. A note shall be provided to the student that another response is needed, when an unanticipated response is given.

10.3.5.6 **Help Sequence.** This section shall describe the on-line help features available to the student. Such help may provide procedural instructions on

the training system hardware and software, or it may provide supplemental or explanatory information on the content of the lesson.

10.3.6 **Testing.** This section shall present an overview of the tests to be developed for a course. Three types of test shall be developed: pretests, progress tests, and post-tests. The following information shall be provided for each type:

a. The method of test presentation.

b. Test content, such as "procedures for data entry simulated by screen graphics", or "knowledge of the sequence of steps required to. . . by fill in the blank test."

c. Pass/fail criteria.

d. Remediation to be available for students who do not meet the specified proficiency levels.

1) Nature of the failure.

2) Purpose of the remediation.

10.3.6.1 **Pretest.** A detailed specification of the intended performances shall be provided. On pretests, feedback shall be provided only after all test items have been completed.

10.3.6.2 **Progress Test.** A detailed specification of the intended performance of each progress test shall be provided. On progress tests, feedback shall be provided to the student after each item, with a general summary feedback after all items have been completed.

10.3.6.3 **Post-test.** A detailed specification for the intended performance test situation shall be provided. On post-tests, feedback shall be provided only after all test items have been completed. At least two alternate versions of each post-test item shall be provided for each terminal and enabling objective.

10.3.7 **Remediation.** This section shall describe how remedial instruction is to be provided to students who fail to achieve the specified criteria on a progress test or on a post-test. The remediation

may be in the form of re-exposure to the original training material, re-exposure to the original material but with different examples, or new material which uses a different approach to the same content.

10.3.8 **Supporting Student Materials.** A listing of any supplementary materials needed to support the course lessons shall be provided.

Part II organization and content shall be as follows:

10.3.9 **Presentation System/Hardware.** A brief description of the functional characteristics of the delivery system shall be provided. This section shall include:

a. Number and display capabilities of screens.

b. Characteristics of all input devices.

c. Availability of color, audio, graphic animation, etc.

d. Unique operating characteristics which could influence the way in which an author or programmer elects to design the training.

10.3.10 **Authoring System Description.** The name and version of the authoring system to be used in building the training material shall be provided. In addition, a brief description shall be provided of any specific authoring system capability or limitation which could influence the lesson material design or its programming.

10.3.11 **Conventions.** This section shall describe the text and graphics conventions which will be used in the production of the CBI courseware:

a. Type - style, size, and use of capitalization.

b. Format - locations, spacing, and amount of text per frame.

c. Color - background, text, headings, and graphics.

d. Punctuation.

e. Use and placement of logos and icons.

f. Use of highlighting and flashing.

g. Placement on the screen of program control selections, such as arrows to step ahead or back in the program.

h. Use of touch-sensitive screens.

10.3.12 **Developer's Notes.** The contractor shall list in this section information which will be of importance to the lesson author, including:

a. References to source material for the lesson.

b. Special instructions to the author about the integration of other student material (e.g. Student Workbook) with the CBI material.

DATA ITEM DESCRIPTION (DID) -17

1. Title:

Plan for Computer-Based Instruction Testing

3. Description/Purpose:

This DID provides the minimum requirements for a plan for computer based instruction (CBI) testing which describes how students will be tested and how test information will be managed for use by the instructor and/or student. The Plan for Computer-Based Instruction testing is prepared following the CBI Lessons Specifications.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the content and format of the plan for CBI testing.

7.2 This DID is applicable to all contract training development efforts for which computer based instruction (CBI) is a component of the instruction.

10. Preparation Instructions:

10.1 Reference Documents. The plan for CBI testing shall be prepared in accordance with the documents referenced in the contract, the CBI lesson specifications, and the CBI testing policy of the FAA organization which is contracting for CBI tests or courseware.

10.2 Format. The plan for CBI testing shall be prepared in accordance with the following format requirements, unless otherwise specified in the contract.

10.2.1 The plan for CBI testing shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 The plan for CBI testing shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.3 A Table of Contents shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Introduction

b. Test Item Descriptions.

c. Displaying of Scores.

d. Test Management Facilities.

e. Glossary.

f. Acronyms.

10.2.4 Each section of the plan for CBI testing named above shall be initiated on a separate page displaying a centered all-caps heading.

10.3 Content Requirements. The plan for CBI testing shall be prepared in accordance with the descriptions provided below:

10.3.1 **Introduction.** The introduction section of the plan for CBI testing shall briefly describe the testing strategies and rationale for their use.

10.3.2 **Test Item Descriptions.** This section of the plan for CBI testing shall include the following for each terminal and enabling objective to be tested:

a. The objective.

b. Test item description(s), including:

1) The wording of the item.

2) How the item will be displayed (for example, as an overlay on video, straight text, via icons or other graphics).

3) The test type represented by the item (e.g., text-based or practical application).

4) The number of times the student will be allowed to respond in the event of an initial incorrect answer.

c. Method by which the student will respond to the item, for example by touching the correct answer on the touch screen.

d. How the item will be scored (for example, if the student will be given credit for a partially correct answer).

e. The feedback that will be given to the student upon responding to the item, for each possible response, each time the student is presented with the item.

f. If relevant, the branching that will occur based on each possible response each time the student is presented with the item.

g. Whether test item randomization capabilities will be used and a description of these capabilities.

10.3.3 **Displaying of Scores.** This section of the plan for CBI testing shall contain a description of the test score information that will be available to the student and the test score information that will be available to the instructor. The procedures that the students and instructors will use to display the test score information shall be described. There shall also be an example of each type of score display screen that will be presented to either the student or the instructor.

10.3.4 **Test Management Utilities.** The test management utilities section of the plan for CBI testing shall contain descriptions of each test management aid available for instructor use. These aids may include utilities such as test item modification, feedback modification, or test type modification. For each utility, the description shall include:

a. A descriptive name for the utility.

b. A description of the function of the utility.

c. A statement of the rationale for including the utility.

d. The procedures to be performed by the instructor in order to access and use the utility.

e. Examples of all the screens and system responses presented during the use of the utility.

10.3.5 **Glossary.** The glossary shall contain technical words, and their definitions, used in the plan for CBI testing.

10.3.6 **Acronyms.** The acronyms section shall contain a list of acronyms, and their meanings, used in the plan for CBI testing.

DATA ITEM DESCRIPTION (DID) -18

1. Title:

CBI Validation Plan and Validation Report

3. Description/Purpose:

The CBI Validation Plan documents the validation activities which will be used to assess the effectiveness and efficiency of CBI courseware. Validation occurs after the CBI courseware has been completed in its initial form. The purpose of validation is to: 1)confirm that all segments of the courseware "play" together, and 2) determine whether the courseware will enable students to achieve the prescribed learning objectives.

The CBI Validation Plan specifies the schedule, processes, and resources to be employed in testing, analyzing, and refining the CBI courseware. The Validation Plan shall be prepared immediately following the Lesson Specifications and the Plan for Computer-Based Instruction Testing.

The results of CBI validation activities shall be documented in a CBI Validation Report. The Validation Report shall be prepared immediately following the pilot test of the CBI courseware.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of a CBI Validation Plan and Validation Report. This DID consists of two separate deliverables, the Validation Plan and the Validation Report. Each deliverable must be documented separately on the Contract Data Requirements List (CDRL).

7.2 This DID is applicable to all contract training developments which will produce electronically-delivered instruction. The term computer-based instruction (CBI) includes computer-based instruction, computer assisted or managed instruction, interactive videodisc (IVD), compact

disc interactive (CD-I), and other advanced training technologies.

10. Preparation Instructions:

10.1 Reference Documents. The CBI Validation Plan and Validation Report shall be prepared in accordance with the documents referenced in the contract.

10.2 Format. The CBI Validation Plan shall be prepared in accordance with the following requirements:

10.2.1 The Plan shall be printed on 8.5" x 11" paper, single or double sided, bound following the contractor's commercial practice. All pages shall be numbered at the bottom center.

10.2.2 Each CBI Validation Plan and Validation Report shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s), if applicable.

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet. The Table of Contents shall list all significant headings used in the report along with their page numbers. Sufficient detail shall be included to permit direct location of any segment of the report.

The Table of Contents for the Validation Plan shall include:

a. Introduction.

b. Validation Schedule.

c. Methodology.

10.3 Validation Plan Contents. The CBI Validation Plan shall be prepared in accordance with the descriptions provided below:

10.3.1 **Introduction.** The Introduction section shall briefly discuss the overall validation process and the procedures to be used to determine the effectiveness of the courseware. The Introduction shall describe all significant limitations and constraints which have influenced the Plan or which will influence the ultimate results.

10.3.2 **Validation Schedule.** The schedule for validation shall cover tryouts of the courseware under instructional conditions that are as close as possible to the conditions under which the final courseware will be implemented. An overall schedule of validation events shall be presented. This schedule shall establish the time frame and locations for the validation.

10.3.3 **Methodology.** Each tryout identified on the validation schedule shall be described in terms of:

a. Course component, including objective(s) and frames and/or sequence identification.

b. Tryout purpose.

c. Resources required, including equipment, subjects, observers/data collectors, facilities, and time.

d. Test materials required, including training software, instructions for all participants, and data collection forms. Drafts of all data collection instruments shall be provided.

e. Procedures for conducting the study and collecting required data.

f. Procedures for data analysis and interpretation.

g. Procedures for reporting results.

10.4 CBI Validation Report. The Validation Report shall document the results of the validation activities. It shall include a discussion of the extent to which students achieved the terminal and enabling objectives, deficiencies in the instruction, and the

accuracy of the time allocations. In the Validation Report, the contractor shall recommend revisions to the instruction and a timeline for completion of the revisions.

DATA ITEM DESCRIPTION (DID) -19

1. Title:

Video Treatments

3. Description/Purpose:

Video Treatments shall be prepared as a narrative description of the proposed content of all video sequences identified to support the CBI Lesson Specifications. These descriptions document the images, time, personnel, location, and facility requirements needed to produce the video segment, whether original production or existing material. The video treatments are prepared following the Lesson Specifications and the Plan for CBI Testing for those courses/lessons requiring video.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of Video Treatment documents.

7.2 This DID is applicable to all contractor-developed CBI training which involves the production of video sequences.

10. Preparation Instructions:

10.1 **Reference Documents**. CBI Video Treatments shall be prepared in accordance with the documents referenced in the contract.

10.2 **Format**. Video Treatments shall be prepared in accordance with the following format requirements:

10.2.1 A separate Video Treatment (description) shall be prepared for each terminal and enabling objective identified in the Lesson Specifications which involve a video sequence.

10.2.2 All Video Treatments for a CBI course shall be bound together as a single document. The document

shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.3 The Video Treatment document shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.4 A Table of Contents page shall follow the cover sheet, specifying the page numbers. The Table of Contents shall include:

a. Introduction.

b. Concept and Approach.

c. Video Treatments.

10.3 Content Requirements. Each Video Treatment document shall be prepared in accordance with the descriptions provided below:

10.3.1 Introduction. The overall treatment of the course shall be described with annotations to indicate each of the video sequences needed for the terminal and enabling objectives. A matrix showing which sequences have various factors in common shall be provided, if applicable.

10.3.2 Concept and Approach. The overall approach to the video sequences and how continuity will be achieved shall be described. For example, will an off-camera narrator be used throughout? Will an on-camera instructor demonstrate the procedures? Will animation be used to show a process flow?

10.3.3 Video Treatments. Each Video Treatment shall include:

a. Terminal and enabling learning objectives.

b. Summary discussion of the theme of each video event.

c. Narrative description of the set and/or location.

d. Casting requirements.

e. Equipment/facilities required.

f. Special effects anticipated.

g. Narrative description of the action.

h. Estimated running time.

i. Probable interaction with ongoing operations while taping.

j. Source (if existing footage is to be used).

DATA ITEM DESCRIPTION (DID) -20

1. Title:

Storyboards/Scripts

3. Description/Purpose:

Storyboards, for computer-based instruction (CBI), build upon the information in the CBI Lesson Specifications DID and provide a detailed picture of each frame in the course. These storyboards constitute the output from the instructional design process and the input to programmers who produce the final training software.

Scripts detail the actions, dialogue, and image by image directions for all of the still and motion video requirements of the storyboard.

The storyboards and scripts are prepared following the Lesson Specifications, the Plan for CBI Testing, and Video Treatments.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of storyboards and scripts.

7.2 This DID is applicable to all contract training developments which will produce electronically-delivered instruction. The term computer-based instruction (CBI) includes computer-based instruction, computer assisted or managed instruction, interactive videodisc (IVD), compact disc interactive (CD-I), and other advanced training technologies.

10. Preparation Instructions:

10.1 Reference Documents. CBI Storyboards and Scripts shall be prepared in accordance with the documents referenced in the contract.

10.2 Format. CBI Storyboards and Scripts shall be prepared in accordance with the following format requirements:

10.2.1 Storyboards and scripts shall be delivered in paper-based form and/or electronically, with the approval of the government. Storyboards and scripts delivered in an electronic format shall be compatible with government computer-based systems and software.

10.2.2 Each Storyboard/Script document shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s). (When more than one Storyboard/Script document must be provided because of the length of the course).

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.3 A Table of Contents page shall follow the cover sheet. The Table of Contents shall list each storyboard and script included in the document, identified by lesson number, along with their respective page numbers.

10.2.4 All storyboards and scripts shall conform to the conventions for media development that were agreed upon by the contractor and the government in Part II of the Lesson Specifications document.

10.3 Storyboards. A standard storyboard format approved by the government shall be used to specify the content and configuration of each CBI frame, and to position and lead into a video still or sequence. Once approved, the format shall remain constant for the complete course. Approved formats shall have the characteristics listed below.

10.3.1 **Content Requirements.** Storyboard pages/screens shall meet the following content requirements:

a. Each storyboard page/screen shall contain the following information:

1) Course name and number.

2) Lesson Specification identification.

3) Lesson Specification objective number.

4) Lesson number and Segment number

5) Instructional component; the type or purpose of the material on each storyboard, such as instructional presentation, pretest, practice exercise, etc.

6) Coded references for:

a) The NEXT frame.

b) The BACK frame.

c) The HELP frame.

d) QUIT.

7) Completion date.

b. The storyboard page/screen shall contain spaces for the programmer to enter, as the programming is accomplished, the following types of information as part of the programming documentation:

1) Frame identification.

2) Authoring system file/block.

3) Graphic file(s) identification.

4) Program identification for NEXT, BACK, HELP, and QUIT, as appropriate.

5) Programmer identification.

6) Completion date.

c. The information entered on the storyboards shall be sufficient to insure that the content and configuration of all frames meets the lesson author's intent and shall adhere to the conventions document.

d. The center portion of the storyboard page/screen shall be a rectangle of generally the same proportions as a CRT screen. Within the rectangle shall be exactly what the lesson author wants to display for each particular frame.

e. Each frame shall contain a representation of the icon panel. Placement shall be standardized to the extent feasible.

10.3.2 **Production Notes.** The bottom area of the storyboard page shall provide space for Production Notes. The Production Notes shall provide all appropriate instructions to programmers. Classes of instructions shall include:

a. Very specific and detailed animation instructions for graphics simulations, (e.g. starting and ending configurations, timing, color changes, etc.).

b. Announcements of the specific additions being sequentially made to graphics that are built frame by frame.

c. Specific areas of each screen which must be touch sensitive, and the necessary screen response for each.

10.4 **Scripts.** For every storyboard which specifies a video sequence, with or without audio, a script shall be prepared. Scripts shall describe the required process and product to meet a video requirement as established by the storyboard sequence. Scripts shall be identified with the specific storyboard they support, and shall be attached to it. They shall be written in a form which the contractor has found to be effective with the production process, and which meets the approval of the FAA client.

10.4.1 **Content.** The script shall provide the spoken word and a description of the scene, camera directions, and audio requirements. It shall meet the information needs of production functions, such as locations, sets, casting, wardrobe, stage directions, stage properties, artwork, stock footage, and special effects.

a. Minimum requirements for video shall include:

1) Description of all shots, including the objectives for the sequence and the action to be photographed.

2) Details of each shot, such as close up and view from above.

3) Stage directions.

4) Editing instructions, including transitions such as fades, special effects, dissolves, and wipes.

5) Resource tapes.

6) Finished time requirements.

b. Minimum requirements for audio shall include all necessary information on the:

1) Audio track.

2) Music cuts.

3) Ambient sound.

4) Sound effects.

5) Written scripts for all narration/dialogue.

6) Narration/dialogue voice requirements.

DATA ITEM DESCRIPTION (DID) -21

1. Title:

Video Shot List

3. Descriptio/Purpose:

The Video Shot List is a listing of video motion and still frame shots. Its purpose is to assist in the efficient organization of the required video production for computer-based instruction (CBI) training development. The descriptive information for each shot included in the Video Shot List is taken directly from the approved script; this information is then organized and sequenced in a way that will maximize production efficiency. The Video Shot List is prepared following the Storyboards/Scripts documentation.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the preparation instructions for the format and content of the Video Shot List.

7.2 This DID is applicable to all contract CBI course development in which still or motion video must be produced and integrated into the training material.

10. Preparation Instructions:

10.1 Reference Documents. The Video Shot List shall be prepared in accordance with the documents referenced in the contract.

10.2 Format. The Video Shot List shall be prepared in accordance with the following format requirements:

10.2.1 The Video Shot List shall be printed on 8.5" x 11" paper in either single or double page layout and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 Cover. The Video Shot List shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s). (When more than one Video Shot List must be provided because of the length of the course)

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.3 **Table of Contents.** A Table of Contents page shall follow the cover page, specifying the page number for each section of the Video Shot List. The Table of Contents shall include:

a. Introduction.

b. Summary Matrix.

c. Shot Sequences, including:

1) Shot location.

2) Shot description.

3) Audio track information.

4) Audiovisual resource material reference.

5) Graphic artwork reference.

6) Required support services and resources.

10.3 Content Requirements. The Video Shot List shall be prepared in accordance with the descriptions provided below:

10.3.1 **Introduction.** This section shall provide an overview of Video Shot List procedures to be used to accomplish a CBI video production. The specific content areas of the report shall be summarized, and instructions provided to facilitate effective use of the document.

10.3.2 **Summary Matrix.** A matrix or series of matrices shall be used to relate video shots to descriptive

and/or identification parameters which permit grouping for production efficiency, including:

a. Storyboard references.

b. Location/set.

c. Shot sequence numbers.

d. Page numbers of specific shot descriptions.

10.3.3 **Shot Sequences.** This section shall contain brief descriptive material, in storyboard reference number sequence, for each video event to be shot. The descriptive material shall be taken directly from the final script and sequenced into a concise workable document. Each sequence shall be described in terms of:

a. Shot location and/or set required.

b. Shot description, including:

1) Stills and motion sequences.

2) Angle and distance of view.

3) Stage directions.

4) Transitions.

5) Character generation requirements.

c. Audio track information. This section shall identify the audio requirements for each scene.

d. Audiovisual resource material reference. This section shall identify existing audiovisual materials to be used, including titles, control numbers, reel numbers, and Society of Motion Picture and Television Engineers (SMPTE) time codes.

e. Graphic artwork reference. This section shall identify and reference all graphic artwork to be used in the training sequences.

f. Required support services and resources. This section shall specify all special support required to accomplish shooting each video sequence.

DATA ITEM DESCRIPTION (DID) -22

1. Title:

CBI Program Documentation

3. Description/Purpose:

Computer-Based Instruction (CBI) Program Documentation provides a detailed record of the software programming which produces the on-screen training material for each CBI training course. Its purpose is to permit programming personnel to understand the software configuration and to be able to interpret the code sufficiently so that routine maintenance and minor program modifications can be made efficiently. CBI Program Documentation pulls together some key information for programmers from other CBI material. Existing material is referenced where applicable. CBI Program Documentation is prepared at the completion of a CBI courseware project.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains preparation instructions for the format and content of CBI Program Documentation.

7.2 This DID is applicable to all contract training developments which will produce electronically-delivered instruction. The term computer-based instruction (CBI) includes computer-based instruction, computer assisted or managed instruction, interactive videodisc (IVD), compact disc interactive (CD-I), and other advanced training technologies.

10. Preparation Instructions:

10.1 Reference Documents. In the preparation of CBI Program Documentation, the contractor shall adhere to the documents referenced in the contract.

10.2 Format. CBI Program Documentation shall be prepared in a specific format judged by the contractor to most

effectively facilitate understanding and usability during program maintenance and/or modification.

10.2.1 Each CBI training course shall have an individual program document which is printed on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 All flowcharts, tables, and figures shall be drawn and reproduced so that all labels and notations are clearly readable.

10.2.3 The CBI Program Documentation shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s), if applicable

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.4 A Table of Contents page shall follow the cover sheet, specifying the page numbers for all sections and for all tables and figures. The Table of Contents shall include:

a. Introduction.

b. Training System Description.

1) Hardware.

2) Authoring Language/System.

c. Program Functionality.

1) General.

2) Utilities.

3) Menu Frames.

4) Instructional Frames.

5) Test Frames.

6) Graphics Library.

d. Data Files.

e. Appendices.

1) Lesson Flowcharts.

2) Source Code.

10.3 Content Requirements. Each CBI training course Program Documentation shall be prepared so that a competent programmer, who is familiar with the training system hardware and with the authoring language/system, can understand all of the program functionality, and can accomplish all required program maintenance and modifications. Each document shall contain at least the following information:

10.3.1 **Introduction.** The introduction shall establish the purpose and scope of the training, and the content areas of the CBI Program Documentation.

10.3.2 **Training System Description.** This segment of the CBI Program Documentation shall describe the operating characteristics of the hardware and software with which the programmer will interact in maintaining and modifying the program. This description shall be based on the training system characteristics described in Part II of the CBI Lesson Specifications document.

10.3.2.1 Hardware. Each equipment component of the training system shall be specified and described. The descriptions shall list all of the operational features of the equipment which interact with the authoring software and/or the training program.

10.3.2.2 Authoring Language/System. The specific tool(s) used to assemble the training program shall be named and described. An authoring system which is used in its standard (unmodified) form to write the training materials need only be named or otherwise identified as to source and version. Sufficient description of a customized authoring

system or language shall be included to permit complete programmer understanding. If necessary for ease of reference, this material may be contained in a separate volume.

10.3.3 Program Functionality. This section of the document shall detail the ways in which the various components of the training program work, and how changes, if necessary, can be made to the original courseware. Program functionality shall be systematically organized to clearly portray the relationships between and among program components, and shall use verbal descriptions, flowcharts, tables, and other graphics as appropriate. Training program components shall include:

10.3.3.1 General. An overview of the complete course shall be presented. This description shall center around the Course Flowchart, and shall specify the overall configuration of the course, its inter-lesson branch points, and all sequence options. This overview shall be compiled from the CBI Lesson Specifications document and shall not require additional development.

10.3.3.2 Utilities. A detailed functional description shall be provided of each utility or subroutine. A verbal description and flowcharts shall cover at least the following topics:

a. Access - How to get to, and out of, each utility from all appropriate portions of the program.

b. Input and output parameters.

c. Applications - The ways in which each subroutine is/can be used in the training program, including a cross reference matrix of frames by utility.

d. Interrelationships - The ways in which applications of each subroutine can affect or cause a need for further modification in other portions of the program. Included here shall be all applicable conditional statements.

e. Notes - Hints and warnings, along with a description of all known bugs and the procedures for circumventing them.

f. Maintenance - Procedures for accomplishing all of the different modifications which may become appropriate over the life of the training materials, to include:

1) Text changes.

2) Graphics changes.

3) Menu changes.

4) Frame changes.

5) File changes.

6) Changes in the training system operation.

10.3.3.3 Menu Frames. A detailed description of all of the different menu frames utilized in the training program. All frame or screen descriptions shall include at least the following parameters:

a. Access.

b. Inputs/Outputs.

c. Applications.

d. Interrelationships.

e. Permissible responses/system responses.

f. Notes.

g. Maintenance.

10.3.3.4 Instructional Frames. A detailed description of the format and functionality of each type of instructional frame. All frame or screen descriptions shall include at least the parameters listed under Menu Frames (10.3.3.3).

10.3.3.5 Test Frames. A detailed description of the format and functionality of each type of test frame. All frame or screen descriptions shall include at least the parameters listed under Menu Frames (10.3.3.3).

10.3.3.6 Graphics Library. This section shall contain a complete listing of all the stored graphics

images, with instructions for retrieval and storage.

10.3.4 Data Files. This section shall present a comprehensive listing and description of all data files used in or with the training program. Each file shall be identified and summarized in terms of:

a. Functional description.

b. Source(s) of input data.

c. Users--the specific data called by individual routines.

d. File structure.

10.3.5 Appendices. The following appendices shall be included in the CBI Program Documentation:

10.3.5.1 Lesson Flowcharts. This section shall contain all of the individual lesson flowcharts in the sequence of presentation. These flowcharts, along with the Course Flowchart referenced in 10.3.3.1, shall be sufficient to depict all program components, branch points, and conditions for the development and the conduct of training. The flow chart information shall be compiled from the CBI Lesson Specifications, and shall not require additional development.

10.3.5.2 Source Code. This section shall list all global and local variables, with a description of what they do or mean. Parameters of description shall include, but not be limited to:

a. Environmental or pre-course conditions.

b. Initialization/set up procedures.

c. Inputs and outputs.

d. Conditional events.

e. Any out-of-the-ordinary situation.

DATA ITEM DESCRIPTION (DID) -23

1. Title:

Interactive Courseware for Training Devices

3. Description/Purpose:

This data item description (DID) documents the requirements for deliverables that are developed as part of the interactive courseware for a training device. A series of deliverables are described in this DID: lesson specifications, testing, validation plan and report, video treatments, storyboards and scripts, video shot list, interactive courseware, and courseware documentation. The contents of this DID will be used to monitor the development process for the interactive courseware, to assess its instructional effectiveness, and to determine the adequacy with which the government's requirements have been met.

7. Application/Interrelationship:

7.1 This DID contains the preparation instructions for the format and content of interactive courseware for training devices.

7.2 This DID is applicable to all supporting documentation and electronically delivered courseware, for a training device, that is developed by a contractor. The term "electronically delivered" shall include computer-aided instruction, computer-assisted instruction, computer-based instruction/training, interactive videodisc (IVD), compact disc interactive (CD-I), and other advanced technologies.

10. Preparation Instructions:

10.1 Reference Documents. The deliverables cited in this DID shall be prepared in accordance with the documents referenced in the contract. This DID is related to Computer-Based Instruction (CBI) DIDs 16 through 22.

10.2 Format. The interactive courseware deliverables for a training device shall be prepared in accordance with the following format guidelines:

10.2.1 **Lesson Specifications.** Paragraphs 10.2.1, 10.2.2 10.2.3, and 10.2.4 of DID 16 shall apply.

10.2.2 **Testing.** Paragraphs 10.2.1, 10.2.2, 10.2.3, and 10.2.4 of DID 17 shall apply.

10.2.3 **Validation Plan and Report.** Paragraphs 10.2.1, 10.2.2, and 10.2.3 of DID 18 shall apply.

10.2.4 **Video Treatments.** Paragraphs 10.2.1, 10.2.2, 10.2.3, and 10.2.4 of DID 19 shall apply for interactive courseware that requires video sequences.

10.2.5 **Storyboard and Scripts.** Paragraphs 10.2.1, 10.2.2, 10.2.3, and 10.2.4 of DID 20 shall apply. Storyboards shall be developed for all interactive courseware. Scripts shall be developed for interactive courseware that requires video sequences.

10.2.6 **Video Shot List.** Paragraphs 10.2.1, 10.2.2, and 10.2.3 of DID 21 shall apply for interactive courseware that requires video sequences.

10.2.7 **Program Documentation.** Paragraphs 10.2.1, 10.2.2, 10.2.3, and 10.2.4 of DID 22 shall apply.

10.3 Content. The interactive courseware deliverables for a training device shall be prepared in accordance with the following content guidance:

10.3.1 **Lesson Specifications:** Paragraphs 10.3.1 through 10.3.12 of DID 16 shall apply. In addition, the following specifications shall be followed:

10.3.1.1 The presentation of content shall progress from the known to the unknown and from the simple to the complex. Relevant learning must be recalled.

10.3.1.2 The presentation of content shall be consistent with the course design guide (CDG) sequence of training, when a CDG was developed as training deliverable for a contract. If any deviation from the CDG sequence is proposed, then the rationale

shall be provided to the FAA for review and approval.

10.3.1.3 Content shall be presented in segments that are a reasonable size for recall and application.

10.3.1.4 Learning and application shall be integrated. Training shall emphasize immediate application of new skills and build on skills that were previously learned.

10.3.1.5 The courseware shall be task based. Performance scenarios shall permit application and integration of skills in job relevant scenarios.

10.3.1.6 The instructional management capabilities of the training device software to track student use and performance shall be documented. At a minimum, the instructional management capabilities shall include the ability to track and record performance for each student, by name, on a single test item and for each component of a scenario.

10.3.1.7 Any hardware, software, or authoring system characteristics that may impact the ability of a site to update courseware shall be documented when site-specific training capabilities are a contract requirement.

10.3.1.8 Any supporting materials such as student materials, instructor guides, and quick reference cards shall be identified and their use explained. The proposed format, structure, and content of the supporting materials shall be submitted for government review and approval. Draft and final copies of supporting materials shall be delivered in a format that can be reproduced cost-effectively by the government. The proposed number of copies to be provided per student and training device shall be submitted to the government for approval.

10.3.2 **Testing.** Paragraphs 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.3.5, and 10.3.6 of DID 17 shall apply.

10.3.3 **Validation Plan and Report.** Paragraphs 10.3.1, 10.3.2, and 10.3.3, and 10.4 of DID 18 shall apply.

10.3.4 Video Treatments. Paragraphs 10.3.1, 10.3.2, and 10.3.3 of DID 19 shall apply for interactive courseware that requires video sequences.

10.3.5 Storyboard and Scripts. Paragraphs 10.3.1, 10.3.2, 10.4, and 10.4.1 of DID 20 shall apply. Storyboards shall be developed for all interactive courseware. Scripts shall be developed for interactive courseware that requires video sequences.

10.3.6 Video Shot List. Paragraphs 10.3.1, 10.3.2, and 10.3.3 of DID 21 shall apply for interactive courseware that requires video sequences.

10.3.7 Program Documentation. Paragraphs 10.3.1 through 10.3.5.2 of DID 22 shall apply.

DATA ITEM DESCRIPTION (DID) -24

1. Title:

Video Courseware

3. Description/Purpose:

The Video Courseware data item description (DID) documents the information that the government needs to evaluate the contractor's decisions concerning the content, treatment, and organization of video courseware. This DID contains the documentation for the following deliverables: video lesson specifications, video treatments, video scripts and storyboards, video shot list, and draft and final copies of the video courseware. Each deliverable represents a building block in the process of developing the final video courseware. Guidance is also provided in this DID for the development of written material, such as an information booklet, to support a video tape.

7. Application/Purpose:

7.1 This DID contains the preparation instructions for the format and content of Video Courseware deliverables.

7.2 This DID is applicable to all contract training development that will use video tape as a delivery medium for instruction. A methods and media analysis shall be conducted prior to making the decision to use video during training. For guidance on the preparation of interactive video disc courseware, see DIDs 16 through 22 of FAA-STD 028B.

10. Preparation Instructions:

10.1 Reference Documents. Video courseware deliverables shall be prepared in accordance with the documents referenced in the contract and the approved Course Design Guide (CDG).

10.2 Format. Text-based, Video Courseware deliverables shall be prepared in accordance with the following format requirements:

10.2.1 Each of the text-based deliverables shall be provided on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.2 All text-based, Video Courseware deliverables shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Lesson number(s)/lesson title(s).

d. Contract number.

e. Contractor name and address.

f. Submission date.

10.2.3 Table of Contents page shall follow the cover sheet. For each text-based deliverable, the Table of Contents shall specify the major paragraphs and page numbers that correspond to the Content Requirements in paragraph 10.3 of this DID. Any supporting figures and tables shall also be listed.

10.2.4 One inch beta cam, or its equivalent, shall be used for production of the master video tape. The production format for final copies and the number of copies required shall be in accordance with the specifications of the contract. Draft and final video tapes shall be labeled with the following information:

a. Video title.

b. Course title.

c. Lesson numbers(s).

d. Contractor name.

e. Submission date.

10.3 Content Requirements. Each deliverable shall be prepared in accordance with the following requirements:

10.3.1 **Lesson Specifications.** The Lesson Specifications shall provide the transition from the analysis phase to the design and production of the draft video courseware. The following information shall be provided:

a. Introduction to the Courseware. A brief overview of the purpose and expected application of the courseware for both the video tape, and any supporting materials, shall be provided.

b. Course/Lesson Prerequisites. The prerequisite experience or training of the target audience shall be documented.

c. Lesson Content. The terminal and enabling objectives to be achieved for each video courseware lesson or topic shall be provided. These objectives shall also be documented in the course design guide.

1) A brief overview of the purpose, key points, expected application of each lesson or topic area, and how it is related to other lessons and topics shall be provided. The estimated time requirements for each lesson or topic, and the video tape as a whole, shall also be provided.

2) Each video tape lesson or topic shall teach from the known to the unknown, and from the simple to the complex. Key points shall be summarized at the end of each lesson or topic. Visual material shall accompany and expand upon each key point. Video segments shall be short as possible while still achieving the terminal and enabling learning objectives.

d. Supporting Instructional Material. Information on any supplementary material needed to support the video tape, such as an information booklet or manual, shall be documented. The purpose and structure of the supporting material shall be explained and the content shall be discussed. A sample shall be made available for government review and comment which illustrates the level of detail and layout of the supporting material. Complete draft and final supporting material shall be delivered in a format

that can be reproduced cost-effectively by the government. The supporting instructional material shall provide, at a minimum, the following information for the student.

1) The relationship of the supporting material to the video tape and how the supporting material will be used.

2) Definition of key words and acronyms used in the video tape and supporting material.

3) An outline of key points for each lesson or topic covered in the video tape.

4) Self-checks to assess retention of key points.

5) Diagrams, charts, and illustrations needed to facilitate comprehension and retention of key information.

6) Information on any academic test procedures. See paragraph 10.3.1.e, below.

7) The individual to contact for further information or assistance.

e. Testing. An overview of any hands-on or written tests to be developed as part of the Video Courseware shall be provided. These may include pretests, progress tests, and posttests. All tests shall be developed in accordance with DID-8.

f. Presentation System Software or Hardware. The type of equipment needed to play the overview courseware shall be documented.

g. Validation. The contractor's plan for validating the draft video tape and supporting material shall be documented. Any key milestones at which the contractor requires feedback from the government shall be provided. These milestones shall include information as to expected government participation and responsibilities during shooting, off-line editing, and on-line editing.

10.3.2 Video Treatments. The video treatments shall describe the approach to be taken for each lesson or topic containing video. Each treatment shall describe the "look and feel" of a single video

segment and shall focus on a central theme which is consistent throughout the video tape. The following information shall be provided:

a. A description of the visual content and theme of each video segment for each lesson or topic to be covered. This description shall include the overall approach to each video segment and how continuity shall be maintained.

b. A narrative description of the set and/or location to be used and the equipment/facilities required.

c. A narrative description of the action.

d. Any special effects anticipated.

e. Estimated running time.

f. Video source, if existing footage is to be used.

10.3.3 **Video Storyboards and Scripts.** The storyboards shall provide a complete description of the visual content, often in the form of sketches of the video scenes. The storyboards also document any production notes or special instructions. The scripts shall document all narration and dialogue as well as the audio requirements. The following information shall be provided:

a. A list of any conventions to be followed throughout the video courseware, e.g., natural breaks and transitions between lessons and topics.

b. A visual and/or narrative description of each video segment. The information provided shall be adequate to ensure that the content and organization of each video sequence meets the purpose of the terminal and enabling objectives.

c. Any production notes such as the locations, sets, casting, stage directions, stock footage, and special effects; the details of each shot, such as close-up and view from above; and the editing instructions, including transitions such as fades and dissolves.

d. Special support required to accomplish shooting each video segment.

e. Written scripts for all narration and/or dialogue.

f. Narration and dialogue voice requirements.

g. Information on music cuts, ambient sound, and sound effects.

10.3.4 Video Shot List. The video shot list shall document all video motion and still frame shots. The descriptive information for each shot shall be taken directly from the approved storyboard and scripts deliverable. In the video shot list deliverable, this information shall be organized and sequenced in a way that will maximize production efficiency. The video shot list shall be prepared in accordance with the information provided below:

a. Introduction. An overview of the video shot list procedures to be used to accomplish the video production shall be documented.

b. Summary Matrix. A matrix or series of matrices shall be provided which relates video shots to descriptive and/or identification parameters and which permits grouping for production efficiency, including:

1) Storyboard references.

2) Location/set.

3) Shot sequence numbers.

4) Page numbers of specific shot descriptions.

c. Shot Sequences. Brief descriptive material shall be provided, in storyboard reference number sequence, for each video segment to be shot. The descriptive material shall be taken from the final storyboard and script deliverable and sequenced into a concise workable document. Each segment shall be described in terms of:

1) Shot location and/or set required.

2) Shot description, including:

a) Stills and motion sequences.

b) Angle and distance of view.

c) Stage directions.

d) Transitions.

3) Audio track information. The audio requirements for each scene shall be identified.

4) Audiovisual resource material. Existing audiovisual materials to be used, including titles, control numbers, reel numbers, and Society of Motion Picture and Television Engineers (SMPTE) time codes shall be documented.

5) Graphic artwork reference. All graphic artwork to be used in the training sequences shall be documented.

6) Required support services and resources. All special support required to accomplish shooting each video sequence shall be documented.

10.3.5 **Video Courseware.** The video courseware, including all supplementary instructional material, shall be provided as a draft for government review and comment. The government's recommendations for improvement shall be incorporated into the final copies of the video tape and supporting material. The video tape and supporting material shall be further revised when any changes to training materials, during training development for a contract, impact the instructional content.

DATA ITEM DESCRIPTION (DID) -25

1. Title:

Developmental Tryout

3. Description/Purpose:

This DID provides the minimum requirements for the materials to be used and the procedures to be followed during the developmental tryout(s) of a course. A development tryout is an assessment of the effectiveness of the instructional materials when they are in a semi-finished or draft form. The materials are presented to representatives of the target population, in a training environment, for their use and comment. Information obtained from the developmental tryout(s) is used to improve the instructional effectiveness of the materials prior to the operational tryout of a course.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the instructions for preparing for and performing the developmental tryout.

7.2 This DID is applicable to all contract training development efforts.

10. Preparation Instructions:

10.1 Reference Documents. The developmental tryout shall be prepared and conducted in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 Format. All course materials developed for the developmental tryout shall meet the minimum format requirements specified in the DIDs associated with these materials. All other materials developed for, or as a result of, the developmental tryout shall be delivered on 8.5" x 11" bond paper. Foldout pages may be used as necessary. All pages shall be numbered at the bottom center.

10.3 Content Requirements. The developmental tryout shall be prepared and conducted in accordance with the following descriptions:

10.3.1 **Participants.** The following personnel shall attend the developmental tryout:

a. Contractor personnel with responsibility for the design and development of the course shall be available during the developmental tryout to answer questions about the course. Available contractor personnel shall include:

1) Instructor(s).

2) Developer(s).

3) Appropriate subject matter experts.

b. FAA representatives shall include:

1) The FAA COTR.

2) Subject matter expert(s).

3) Instructional Systems Design Specialist(s).

4) Members of the target population.

10.3.2 **Agenda.** The contractor shall draw up an agenda for the developmental tryout. The agenda shall be submitted to the FAA for approval prior to the developmental tryout.

10.3.3 **Availability of Materials.** Draft versions of course materials to be used during the developmental tryout shall be made available to the FAA for prior review and approval. These course materials may include, but are not limited to, the course schedule, lesson plans, tests, student materials, and media material.

10.3.4 **Materials Tryout.** The contractor shall present to the representatives of the target population the course materials as they would be used in the course.

10.3.5 **Materials Review.** A review of draft materials developed for a course shall be conducted following the developmental tryout. Each review

shall be presented in enough detail and depth so that the integration and effectiveness of the instructional materials, learning sequence, performance exercises, tests, and the time allocations can be fully assessed by the FAA.

10.3.6 **Minutes.** The contractor shall record the minutes during the developmental tryout. The minutes shall include, but not be limited to:

a. The date of the developmental tryout.

b. The course identification number/course title.

c. Titles of lessons in the course.

d. Titles of the presented course materials.

e. Names, organizations, and phone numbers of all participants.

f. All activities that took place during the developmental tryout.

g. All comments made by the FAA and contractor personnel.

10.3.7 **Materials Evaluation.** Once the developmental tryout has occurred, the contractor shall score any tests given during the tryout and assess the effectiveness of the course materials based on student performance and comments made by the other attending FAA representatives.

10.3.8 **Follow-up Activities.** Following the developmental tryout, the contractor shall submit a letter to the FAA with the:

a. Agenda and minutes of the developmental tryout.

b. Results of the developmental tryout and the follow-up review of materials.

c. Proposed revisions to the course based on the FAA's comments, student performance during the developmental tryout, and the follow-up review of materials.

d. Schedule for accomplishing each proposed revision, with an indication of which revisions shall be

completed before the next developmental tryout or the Course Walk-Through.

DATA ITEM DESCRIPTION (DID) -26

1. Title:

Course Walk-Through

3. Description/Purpose:

This DID provides the minimum requirements for the materials for, and the procedures to follow during, the Course Walk Through. The Course Walk-Through is an overview of each component of a course.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) contains the instructions for preparing for and performing the Course Walk-Through.

7.2 This DID is applicable to all contract training development efforts.

10. Preparation Instructions:

10.1 Reference Documents. The Course Walk-Through shall be prepared and conducted in accordance with the documents referenced in the contract and the Course Design Guide (CDG).

10.2 Format. All course materials developed for the Course Walk-Through shall meet the minimum format requirements specified in the DIDs associated with these materials. All other materials developed for, or as a result of, the Course Walk-Through shall be delivered on 8.5" x 11" bond paper. Foldout pages may be used as necessary. All pages shall be numbered at the bottom center.

10.3 Content Requirements. The Course Walk-Through shall be prepared and conducted in accordance with the following descriptions:

10.3.1 Participants. The following personnel shall attend the Course Walk-Through:

a. Contractor personnel with responsibility for the design and development of the course shall be available during the walk-through to answer questions about the course. Available contractor personnel shall include:

1) Instructor(s).

2) Developer(s).

3) Appropriate subject matter experts.

b. FAA representatives shall include:

1) The FAA COTR.

2) Subject matter expert(s).

3) Instructional Systems Design Specialist(s).

10.3.2 **Agenda.** The contractor shall draw up an agenda for the Course Walk-Through. The agenda shall be submitted to the FAA for approval prior to the Course Walk-Through.

10.3.3 **Availability of Materials.** Revised draft versions of all materials associated with the course, including, but not limited to, the course schedule, lesson plans, tests, student materials, and media material, shall be made available to the FAA for approval prior to the Course Walk-Through.

10.3.4 **Presentations.** The contractor shall present a shortened version of each lesson during the Course Walk-Through. Each lesson shall be presented in enough detail and depth so that the integration and effectiveness of the instructional materials, learning sequence, performance exercises, tests, and the time allocations can be fully assessed by the FAA.

10.3.5 **Minutes.** The contractor shall record the minutes during the Course Walk-Through. The minutes shall include, but not be limited to:

a. The date of the Course Walk-Through.

b. The course identification number/course title.

c. Titles of lessons in the course.

d. Names, organizations, and phone numbers of all participants.

e. All activities that took place during the Course Walk-Through.

f. All comments made by the FAA and contractor personnel.

10.3.6 **Follow-up Activities.** Following the course walk-through, the contractor shall submit a letter to the FAA with the:

a. Agenda and minutes of the course walk-through.

b. Proposed revisions to the course based on the FAA's comments during the course walk-through.

c. Schedule for accomplishing each proposed revision, with an indication of which revisions shall be completed before validation of the course.

DATA ITEM DESCRIPTION (DID) -27

1. Title:

First Course Conduct and Course Report

3. Description/Purpose:

This DID establishes the minimum requirements for the Course Validation Plan, first course conduct, and the Course Report. The Validation Plan for the first course conduct must be submitted and approved by the FAA COTR prior to validation. Developmental tryouts prior to the first course conduct are also recommended. The results of the first course conduct are documented in the Course Report.

7. Application/Interrelationship:

7.1 This Data Item Description (DID) documents the format and content requirements for validation deliverables.

7.2 This DID is applicable to all contract training development efforts except validation of stand-alone, Computer-Based Instruction (CBI) courseware. Validation of CBI courseware shall be conducted in accordance with DID-18.

10. Preparation Instructions:

10.1 Reference Documents. The instructional materials to be used during the conduct of the validation shall be prepared in accordance with the documents referenced by the contract and the Course Design Guide (CDG).

10.2 Format. The validation materials shall be prepared in accordance with the following format requirements:

10.2.1 The Validation Plan shall conform to the following format requirements:

10.2.1.1 The Validation Plan shall be delivered on 8.5" x 11" bond paper and bound following the contractor's commercial practice. Foldout pages may be used as required. All pages shall be numbered at the bottom center.

10.2.1.2 The Validation Plan shall have a cover sheet displaying the following information:

a. Document title.

b. Course identification number/course title.

c. Contract number.

d. Contractor name and address.

e. Submission date.

10.2.1.3 A Table of Contents for the Validation Plan shall follow the cover sheet. The Table of Contents shall list all significant headings used in the plan and the page numbers. Sufficient detail shall be included to permit direct location of any segment of the plan. The Table of Contents shall include:

a. Introduction.

b. Validation Schedule.

c. Methodology.

d. Examples of data collection forms.

10.2.1.4 The data collection forms shall each contain heading information to be filled in. The heading information shall allow for the identification of the course and identification of the individual filling out the form. All data collection forms shall be delivered to the FAA COTR, for approval prior to use, on 8.5" x 11" bond paper and bound following the contractor's commercial practice.

10.2.2 **Conduct of the Course.** All instructor and student materials used during the first course conduct shall conform to the formats specified in the associated DID's and the contract.

10.2.3 **Course Report.** A Table of Contents for the Course Report shall follow the cover sheet. The Table of Contents shall include the:

a. Introduction.

b. Training outcomes.

c. Class data.

d. Comments.

e. Test data.

f. Recommended revisions.

g. Supporting documentation.

h. Official roster.

10.3 Content Requirements. The contents of validation materials shall be prepared in accordance with the descriptions provided below:

10.3.1 **Validation Plan.** The contents of the Validation Plan shall be as follows:

10.3.1.1 **Introduction.** The Introduction section shall briefly discuss the overall validation process and the procedures to be used to determine the effectiveness of the course. The Introduction shall describe all significant limitations and constraints which have influenced the Plan or which will impact the validation results.

10.3.1.2 **Validation Schedule.** The schedule for validation shall cover tryouts of the course under instructional conditions that are as close as possible to the conditions under which the actual course will be conducted. An overall schedule of validation events shall be presented. This schedule shall establish the timeframe and location(s) for the validation.

10.3.1.3 **Methodology.** Each tryout identified on the validation schedule shall be described in terms of the:

a. Purpose of the validation.

b. Expected training outcomes.

c. Validation process to be used.

d. Resources required including equipment, subjects, observers/data collectors, facilities, and time.

e. Evaluation materials required, including instructions for all participants.

10.3.1.4 Data Collection Forms. Examples of all data collection forms and instruments shall be provided for FAA review and approval prior to use.

10.3.2 Conduct of the Course. The following materials shall be provided and used during the first course conduct:

a. Student Materials.

b. Lesson Plans.

c. Instructor Checklists.

d. Lesson Evaluation Checklists.

e. Student Critique Sheets.

f. End-of-Course Evaluation Questionnaires.

10.3.2.1 Student Materials. The contractor shall provide copies of all student materials to each student in the course.

10.3.2.2 Lesson Plans. The contractor shall supply the FAA representatives attending the first course conduct with copies of the lesson plans for the course. FAA representatives attending the first course conduct will include:

a. The FAA COTR.

b. Subject matter specialist(s).

c. Instructional systems design specialists.

10.3.2.3 Instructor Checklists. The Instructor Checklists shall allow the course instructors to evaluate the course lesson-by-lesson. The Instructor Checklists shall be completed by the course instructors at the completion of each lesson. The Instructor Checklists shall contain items which address instructor concerns. An example of an Instructor Checklist appears in Figure 27-1 of this DID.

10.3.2.4 Lesson Evaluation Checklists. The contractor shall provide the FAA representatives attending

the course with lesson evaluation checklists. The Lesson Evaluation Checklists shall allow the FAA representatives attending the course to evaluate each lesson as it is presented. An example of a Lesson Evaluation Checklist appears in Figure 27-2 of this DID.

10.3.2.5 Student Critique Sheets. The Student Critique Sheets shall allow the students participating in the first course conduct to evaluate each lesson after it is presented. The contractor shall fill in the administrative information on the critique sheet for the students. The administrative information shall include the instructor name, course title and number, lesson title and number, and the date of the validation. An example of a Student Critique Sheet appears in Figure 27-3 of this DID.

10.3.2.6 End-of-Course Evaluation Questionnaires. The End-of-Course Evaluation Questionnaires shall allow the students to evaluate the course overall. Each student shall fill out a questionnaire. Figure 27-4 of this DID shows a sample questionnaire that is appropriate for an equipment-oriented course. A sample questionnaire for a non-equipment oriented course is shown in Figure 27-5 of this DID.

10.3.3 Course Report. The sections of the Course Report shall be prepared in accordance with the descriptions provided below:

10.3.3.1 Introduction. The Introduction shall include:

a. Course number and title.

b. Class number.

c. Course description, including:

1) Brief overview of the course.

2) Total time scheduled for the new course.

3) Course prerequisites by course number and title.

10.3.3.2 Training Outcomes. The training outcomes section, an example of which appears in Figure 27-6, shall include:

a. Training outcomes for the course.

b. Lesson plan title(s) and number(s) supporting each enabling objective.

c. Estimated and actual times for completing each training outcome, terminal objective, and lesson plan.

10.3.3.3 Class Data. The class data section shall contain:

a. Beginning and ending dates of the course.

b. Class Roster (names of students in attendance).

c. Number of students in attendance.

d. Number of students meeting course prerequisites.

e. Daily class schedule for resident classes.

10.3.3.4 Comments. The Comments section shall include summaries of comments of students, instructors, and FAA representatives attending the course. These summaries shall include:

a. Summary of the information in the completed lesson Evaluation Checklists completed by the FAA representatives.

b. Summary of the information in the completed Instructor(s) Checklists.

c. Summary of the information in the completed Student Critiques.

d. Summary of the information in the End-of-Course Questionnaires completed by students who meet course prerequisites.

e. Summary of the information in the End-of-Course Questionnaires completed by students who do not meet course prerequisites.

10.3.3.5 Test Data. The Test Data section shall include information about each graded test presented in the course. The Test Data section shall be subdivided into two subsections:

a. Test Data Listing (Figure 27-7 of this DID shows an appropriate format for this subsection), in which each graded test is listed by name, with information concerning the:

1) Type of test (pretest, progress test, and post-test) for both written and performance tests.

2) Class average (mean in percent) for students who meet course prerequisites and for students who do not meet prerequisites.

3) Range of scores (in percent) for students who meet course prerequisites and for students who do not meet prerequisites.

4) Number of students meeting the passing criteria, if applicable.

b. Ease Index (Figure 27-8 of this DID shows an appropriate format for this subsection), for each tested item for two categories of students, those who meet course prerequisites and those who do not meet prerequisites. The Ease Index of an item is the number of correct responses for the item divided by the number of students responding to the item.

10.3.3.6 **Recommended Revisions.** The Recommended Revisions section shall contain a list of recommended revisions to the course, listed by lesson title and number and in the order in which the lessons were presented. The Recommended Revisions section shall also contain a timeline for accomplishing each recommended revision. The recommended revisions shall address, but are not limited to, the following areas:

a. Course organization and content.

b. Instructional methods and media.

c. Instructor capabilities.

d. Instructional materials, including instructor and student materials.

e. Facilities and equipment.

10.3.3.7 **Supporting Documentation.** All supporting documentation shall be turned over to the FAA, in

its original form, as part of the Course Report. Supporting documentation shall include all completed:

a. Instructor Checklists.

b. Lesson Evaluation Checklists.

c. Student Critiques.

d. End-of-Course Evaluation Questionnaires.

e. Original Student Achievement Tests.

10.3.3.8 Official Roster. The Official Roster shall contain the names of the students attending the course and a grade for each student. The Official Roster is generated by the Consolidated Personnel Management Information System (CPMIS) and shall be supplied by the FAA.

DID 27, FIGURE 1, SAMPLE INSTRUCTOR CHECKLIST

INSTRUCTOR CHECKLIST (FOR CONTRACTOR USE)

INSTRUCTOR _____ **COURSE** _____ **COURSE NO.** _____

LESSON TITLE _____ **LESSON NO.** _____ **DATE** _____

The instructor checks "Yes" or "No" for each item during the first course conduct. Use "Comments" column for notes which prove useful if revision to the lesson is necessary. Recommend appropriate revision for any item marked "No".

	YES	NO	COMMENTS
Is the subject outline in the lesson plan easy to follow?	☐	☐	
Are the instructions for conducting performance exercises clear and complete?	☐	☐	
Are the instructions for administering the tests clear and complete?	☐	☐	
Does the lesson plan reference all materials and equipment needed to conduct the lesson?	☐	☐	
Is the equipment for the lesson available and accessible?	☐	☐	
Are the training aids –	☐	☐	
• readable and easy to understand?	☐	☐	
• easy to use?	☐	☐	
Do visuals correspond with the numbers in the lesson plan?	☐	☐	
Do the response items challenge the students?	☐	☐	
Are the instructional materials –	☐	☐	
• adequate to support the objectives?	☐	☐	
• written at an appropriate level for the students?	☐	☐	
Do the instructional strategies –	☐	☐	
• encourage student participation?	☐	☐	
• make effective use of the media?	☐	☐	
Are the learning activities safe?	☐	☐	
Is the sequence of the lesson logical?	☐	☐	
Is the time for conducting the lesson adequate?	☐	☐	
Is the lesson objective(s) achieved?	☐	☐	

DID 27, FIGURE 2, SAMPLE VALIDATION CHECKLIST

LESSON EVALUATION CHECKLIST (FOR FAA USE)

REVIEWER _____ POSITION TITLE _____

INSTRUCTOR _____ COURSE _____ COURSE NO. _____

LESSON TITLE _____ LESSON NO. _____ DATE _____

FAA representative in attendance at the first course conduct checks "Yes" or "No" for each item. Use "Comments" column for notes which prove useful if revision to the lesson is necessary. Recommend appropriate revision for any item marked "No".

	YES	NO	COMMENTS
Does each student have a copy of the materials?	☐	☐	
Are reference materials available?	☐	☐	
Is equipment available and accessible?	☐	☐	
Is the space for student adequate?	☐	☐	
Does the instructor –			
• show enthusiasm?	☐	☐	
• demonstrate mastery of the subject?	☐	☐	
• use training aids/equipment effectively?	☐	☐	
• ask timely questions?	☐	☐	
• use positive reinforcement?	☐	☐	
Do the visuals match the presentation?	☐	☐	
Are visuals readable and easy to understand?	☐	☐	
Are safety precautions observed?	☐	☐	
Are test stored securely?	☐	☐	
Do the majority of students participate?	☐	☐	
Is the sequence of the lesson logical?	☐	☐	
Is the lesson well paced?	☐	☐	
Is the lesson objective(s) achieved?	☐	☐	

DID 27, FIGURE 3, SAMPLE STUDENT CRITIQUE SHEET

STUDENT CRITIQUE SHEET

INSTRUCTOR _____ **COURSE** _____ **COURSE NO.** _____

LESSON TITLE _____ **LESSON NO.** _____ **DATE** _____

- Students complete this questionnaire for each lesson in the first course conduct.
- Please comment on each of the items below. Your feedback is important for determining the effectiveness of the lesson.

Is this lesson relevant to your job? Will this lesson help you perform your job better?

Is there a balance between theory and practice in this lesson?

Are the training aids in this lesson effective? (Readable? Understandable? Appropriate to the presentation?)

Is there enough opportunity in this lesson to participate? (Discussion, questioning, student-student interaction, small group work, hands-on exercises, etc.)

Is there anything in this lesson that you would like changed? How would you change it?

Is this lesson objective(s) achieved?

DID 27, FIGURE 4, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (EQUIPMENT)

Employee's Name	Period of Training
Out-of-Agency Course	Contractor

In order that we may use your experience, we would appreciate your comments on the above training. These will assist us in evaluating contractor performance and the validity of contract specifications.

If sufficient space is not provided for your comments, please attach a separate sheet. Your responses will in no way affect or be reflected on your training record.

ELEMENTS	Yes A	No B	See Remarks C	Does Not Apply D
TRAINING OUTCOMES:				
1. Were you given training outcomes or objectives at the course introduction?				
2. Were you given objectives with each lesson/module?				
3. Were you given objectives with the hands-on exercises?				
CONCEPTS TRAINING:				
4. Were you given general equipment concepts?				
5. Were you taught specific equipment concepts?				
6. Were you taught normal equipment operation?				
7. Were you taught abnormal equipment operation?				
8. Were you taught the use of technical manuals?				
9. Were you taught the use of Operator manuals?				
10. Were you taught concepts of built-in test equipment?				
11. Did concept training teach off-line test equipment?				
12. Did the concept training teach diagnostic routines?				
13. Did the concept training teach operational program?				
14. Did the concept training teach preventive maintenance requirements?				
15. Did the concept training teach corrective maintenance?				
TRAINING MATERIALS:				
16. Were training materials job related?				
17. Were training materials useful for self-study?				
18. Were training materials sequenced or in order of the topics?				
19. Were training materials useful to class work?				
20. Were training materials useful in lab/hands-on?				
21. Were training materials free of errors?				
22. Were training materials closely related to subject being taught?				

DID 27, FIGURE 4, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (EQUIPMENT) (CONTINUED)

ELEMENTS	Yes A	No B	See Remarks C	Does Not Apply D
HANDS-ON TRAINING:				
23. Did hands-on training teach System power-up/start?				
24. Did hands-on training teach System power-down/stop?				
25. Did hands-on training teach preventive maintenance tasks?				
26. Did hands-on training teach use of built-in test equipment?				
27. Did hands-on training teach use of off-line test equipment?				
28. Did hands-on training teach fault isolation to board/module level?				
29. Did hands-on training teach fault isolation to software/ firmware level?				
30. Did hands-on training teach fault isolation to piece/part level?				
31. Can you now (with references), do preventive tasks?				
32. Can you now (with references), make essential adjustments?				
33. Can you now (with references), set up test equipment?				
34. Can you now (with references), use diagnostic routines?				
35. Can you now (with references), power-up/start system?				
36. Can you now (with references), power-down/stop system?				
37. Can you correctly determine that system operation is normal?				
38. Can you correctly identify controls?				
39. Can you correctly identify indicators?				
40. Can you correctly interpret monitor/indicator readouts?				
41. Can you isolate malfunctions?				
42. Were hands-on exercises tied into concepts training?				
43. Were hands-on exercises supervised?				
44. Were hands-on exercises derived from tech. manual content?				
45. Were hands-on exercises individually performed?				
46. Were hands-on exercises directly related to the job task?				
47. Were hands-on exercises graded or evaluated?				
48. Did hands-on exercises reinforce a concept or job task?				
TIME ALLOCATION:				
49. Was there sufficient time allotted to concepts?				
50. Was sufficient time allotted to hands-on?				
51. Was excessive time allotted to concepts?				
52. Was excessive time allotted to hands-on?				
TESTS:				
53. Were the tests based on the training lesson objectives?				
54. Did the tests include performance testing?				
55. Did the tests include fault isolation?				

DID 27, FIGURE 4, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (EQUIPMENT) (CONTINUED)

ELEMENTS	Yes A	No B	See Remarks C	Does Not Apply D
ENVIRONMENT:				
56. Was the lighting adequate in the classroom?				
57. Was the ventilation adequate in the classroom?				
58. Was the noise level kept low in the classroom?				
59. Was the classroom kept clean?				
60. Was laboratory lighting adequate?				
61. Was laboratory ventilation adequate?				
62. Was laboratory noise level controlled?				
63. Was the equipment in the lab in good condition?				
64. Were good safety practices used in the laboratory?				
INSTRUCTOR PERFORMANCE:				
65. Was the instructor prepared for the lesson/module?				
66. Did the instructor cover all topics?				
67. Did the instructor direct learning activities?				
68. Did the instructor control the class?				
69. Did the instructor provide feedback to you on your progress?				
70. Did the instructor provide you with the supervised study?				
71. Did the instructor answer all questions?				
72. Did the instructor explain training outcomes/objectives?				
Was the instructor knowledgeable in the subject matter?				
Was the instructor available full time?				

75. Would you recommend continuing training with this contractor? Yes___ No__
If not, why?

_____

_____

_____

_____

76. Would you recommend using the same instructor(s) in future training? Yes__
If not, why?

_____

_____

DID 27, FIGURE 4, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (EQUIPMENT) (CONTINUED)

77. Please provide any suggestions that you feel would improve this training program or future contract training programs.

78. Comments on lodging, transportation and food availability, convenience, quality and cost.

DID 27, FIGURE 5, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (NON-EQUIPMENT ORIENTED)

COURSE TITLE _____

COURSE NO. _____

DIRECTIONS

- In Section A of the questionnaire, rate each item as:
  - Almost Never
  - Some of the Time
  - Half of the Time
  - Most of the Time
  - Almost Always
- In Section B, indicate the extent to which this course prepared you with the skills and knowledge to fulfill each training outcome of the course.

DID 27, FIGURE 5, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (SECTION A)

END-OF-COURSE EVALUATION QUESTIONNAIRE FOR STUDENTS

COURSE: _____
NUMBER: _____
DATES: _____

	ALMOST NEVER	SOME OF THE TIME	HALF OF THE TIME	MOST OF THE TIME	ALMOST ALWAYS
1. The objective(s) for each lesson in the course was presented and clearly indicated what you needed to learn.	A	B	C	D	E
2. The course instruction provided enough information to accomplish the objectives.	A	B	C	D	E
3. Course materials did not seem to duplicate or overlap.	A	B	C	D	E
4. Course materials were available at the start of the course or were provided at the appropriate time during the course.	A	B	C	D	E
5. The instruction allowed for student involvement and participation.	A	B	C	D	E
6. Classes started and ended on time.	A	B	C	D	E
7. Breaks were provided and not abused.	A	B	C	D	E
8. Time was not wasted in the course to set up training aids, equipment, or demonstrations.	A	B	C	D	E
9. Written and oral questions were used.	A	B	C	D	E
10. The procedures/processes taught in the classroom were consistent with what was required in lab.	A	B	C	D	E
11. Sufficient practice time was given before being evaluated on a performance test.	A	B	C	D	E
12. Questions were answered professionally and promptly by the instructor(s).	A	B	C	D	E
13. Training aids, handouts, texts, and audiovisuals made the instruction more understandable.	A	B	C	D	E
14. The time devoted to each lesson of the course was sufficient to understand the basic concepts.	A	B	C	D	E
15. The instruction received in the classroom allowed me to perform effectively in the lab.	A	B	C	D	E
16. The class/lab was adequately equipped.	A	B	C	D	E
17. The class/lab equipment was reliable.	A	B	C	D	E
18. The class/lab was adequately lighted.	A	B	C	D	E
19. The class/lab was adequately ventilated.	A	B	C	D	E
20. The test instructions were clear.	A	B	C	D	E
21. The test items seemed to be taken from the material covered in the classroom/labs.	A	B	C	D	E
22. Test items were clearly written and understandable.	A	B	C	D	E
23. Test feedback was sufficient to clarify any problem areas.	A	B	C	D	E
24. The time allotted for taking tests was sufficient.	A	B	C	D	E

DID 27, FIGURE 5, SAMPLE END-OF-COURSE EVALUATION QUESTIONNAIRE (SECTION B)

END-OF-COURSE EVALUATION QUESTIONNAIRE FOR STUDENTS COURSE: _____ NUMBER: _____ DATES: _____	ALMOST NEVER	SOME OF THE TIME	HALF OF THE TIME	MOST OF THE TIME	ALMOST ALWAYS
25. (List Training Outcomes Here)	A	B	C	D	E
26.	A	B	C	D	E
27.	A	B	C	D	E
28.	A	B	C	D	E
29.	A	B	C	D	E
30.	A	B	C	D	E
31.	A	B	C	D	E
32.	A	B	C	D	E
33.	A	B	C	D	E

On-the-job Training (OJT). Method of training, usually delivered at a work site. OJT may combine several methods of instruction, including formal classroom training, reading assignments, job performance with or without supervision, self-paced instructional materials, and CBI.

Performance Exercise. Activities designed so the students can physically apply lesson information to job-like situations.

Position. Duties and tasks established as the work requirement for one individual.

Post-test. A test administered at the end of a course or block of instruction to determine the mastery level of the students. Post-tests may be written tests or performance tests.

Prerequisite. A course(s) which must be successfully completed prior to enrollment, or an approved screening examination which measures the level of knowledges and skills equivalent to that which could have been achieved in the prerequisite course(s).

Pretest. A test administered before training occurs to assess entry level skills. The pretest may be used as a baseline to measure student progress and to test out of training when the student demonstrates mastery.

Progress Test. A test given during the course to indicate individual student and class progress toward mastery of the course material. Progress tests may be written or performance tests.

Responder Item. Response item which requires using a mechanism (for example, pushing one of three buttons) to indicate the correct answer.

Response Item. Any oral or written question to which the student responds.

Skill. Physical, mental, or manipulative activity.

Standard (of Performance). A component of an objective which states the minimum level of proficiency; or how well a process must be accomplished; the acceptable quality or quantity of a product.

Subject Matter Expert (SME). Responsible for assessing the technical accuracy of the instructional materials.

Subtask. A step in the accomplishment of a task. Each subtask within a task is independent of all other subtasks. A subtask's statement starts with an action verb and includes the object of that verb.

DID 27, FIGURE 7, SAMPLE TEST DATA LISTING

COURSE: LOW LEVEL WINDSHEAR ALERT SYSTEM (LLWAS) FA9980, FA9981 COURSE NO. 40268

WRITTEN TESTS	TYPE			CLASS AVERAGE		RANGE OF SCORES		NO. OF STUDENTS PASSING	
	PRE	PROGRESS	POST	P	NP	P	NP	P	NP
FUNDAMENTALS	X			85	81	56-89	60-85	5	6
PDP II COMPUTER		X		79	72	65-89	60-79	7	4
REMOTE WIND UNITS		X		81	79	61-94	68-88	6	4

PERFORMANCE TESTS	TYPE			CLASS AVERAGE		RANGE OF SCORES		NO. OF STUDENTS PASSING	
	PRE	PROGRESS	POST	P	NP	P	NP	P	NP
CS MASTER CONTROLLER/ MODEM		X		83	80	60-88	60-90	7	4
CS MASTER RADIO		X		79	77	56-84	65-80	7	4
CORRECTIVE MAINTENANCE			X	86	84	74-96	70-92	6	4

P Number of Students Meeting the Course Prerequisites

NP Number of Students Not Meeting the Course Prerequisites

DID 27, FIGURE 8, SAMPLE EASE INDEX FOR TEST ITEMS

COURSE: LOW LEVEL WINDSHEAR ALERT SYSTEM (LLWAS)
FA9980, FA9981 COURSE NO. 40268

TEST: SYSTEM OPERATIONS - PERFORMANCE MEASURE

TYPE OF TEST: POST-TEST

ITEM	OBJECTIVE NO.	EASE P	INDEX NP
1	B2c	.93	.90
2	B2e	.82	.79
3	B2b	.69	.54
4	B2f	.78	.75
5	B2g	.35	.37
6	B2c	.70	.71
7	B2a	.84	.80
8	B2e	.81	.82
9	B2d	.89	.87
10	B2e	.60	.59
11	B2d	.22	.23
12	B2a	.21	.31
13	B2b	.92	.89
14	B2a	.80	.80
15	B2e	.91	89

P Number of Students Meeting the Course Prerequisites

NP Number of Students Not Meeting the Course Prerequisites

APPENDIX 2

GLOSSARY

APPENDIX 2

GLOSSARY

Behavior. The part of a learning objective which describes the action to be performed.

Block Test. A test (written or performance) designed to measure the accomplishment of the objectives of a block or module of instruction.

Block (or module) of Instruction. A group of related instructional units covering a major subject area. Logical training segments.

Camera Ready Copy. Format, as stated in Specification 2494, for the final submission of materials, which allows for high quality reproduction, as specified in the contract for training.

Cognition. The process of knowing, including both awareness and judgment.

Cognitive Task Analysis. A systematic process for determining the cognitive processes and strategies that support job performance.

Commercial Off-the-shelf Training Materials. Commercially available training materials which are already developed and produced.

Computer Based Instruction (CBI). An overall term which refers to any generalized use of computers in the training process. CBI consists of a management component, Computer Managed Instruction (CMI) and a delivery component, Computer Assisted Instruction (CAI).

Concurrence. Written consent which signifies agreement.

Condition (of Performance). What is provided or restricted from use in the work environment (for example, tools, equipment, time). The "condition" is generally stated at the beginning of a three-part objective.

Contract Data Requirements List (CDRL). List included in a contract which states the deliverables to be submitted, the submission date for each, and to whom the contractor shall submit them.

Contracting Officer's Technical Representative (COTR). An individual in the FAA designated by the FAA Contracting Officer,

who provides the technical training oversight of a contractor's effort.

Contracting Officer. An individual in the FAA who provides legal expertise in a contracting situation and has the authority to approve deliverables.

Correspondence Study Materials. Correspondence study materials are individualized self-paced study materials used in a correspondence course. Correspondence study materials include reading assignment(s) and supporting illustrations, review exercises and associated answer keys, student progress tests, and a post-test.

Course Design Guide (CDG). The course design guide consists of three parts. Part I is the management summary and contains information for resource decisions. Part II contains the training outcomes, terminal objectives, and enabling objectives and the types of learning, test types, technical content, and instructional methods and media for each objective. Part III cross-references the sequenced training outcomes, the tasks selected for training in the task and skills analysis, and the terminal objectives contained in Part II of the CDG.

Course Report. A document containing information about the results of course validation, such as the extent to which the objectives are achieved, deficiencies exist in the instruction, and accuracy of time allocations occurs. Recommended revisions to the instruction and a timeline for their completion are included in the report.

Course Schedule. Depicts, in a grid format, the time allocated for each major course topic and for each lesson for each week of the course.

Course Walk-through. An overview of a course, given by a contractor to FAA representatives, in which the integration and traceability of the components of the instruction are assessed.

Criterion Referenced Test. A type of test which compares a student's performance against a fixed standard rather than the performance of other students.

Criticality. A characteristic that indicates how essential it is to perform the task or subtask.

Data Item Description (DID). A specification of the content and format requirements of training deliverables, or products.

Deliverable. A product developed by the contractor which is required by a line item in the contract.

Developmental Tryout. A part of course validation in which the instruction or instructional materials (in draft form) are presented to peers and training experts to determine their effectiveness before being finalized.

Difficulty. A characteristic task that indicates how hard it is to perform the task or subtask.

Duty. A discrete segment of a job encompassing two or more related tasks. A duty statement starts with an action verb and includes the object of that verb. Examples: perform corrective maintenance; maintain radar separation.

Enabling Objective. A three-part statement, containing a condition(s), behavior, and standard(s). Enabling objectives support terminal objectives and are sometimes referred to as lesson objectives.

Evaluation. An ongoing process that determines the effectiveness of a program or course and identifies changes, if necessary.

First Course Conduct. The first presentation of a course developed by a contractor to the student population. Generally, the first course conduct is conducted by the contractor, however, this will be stipulated by the training contract.

Flowchart. A graphic representation of the sequence of steps and decisions that make up a task, a "roadmap" of the task.

Formative Evaluation. Process through which instructional materials are evaluated for technical accuracy and instructional soundness prior to final delivery to students.

Frequency. A characteristic of a task that indicates the number of times per work period (for example, shift, weekly, monthly) a task or subtask is performed.

Instructional Materials. Any materials which are developed or obtained to support the instruction; for example, lesson plans, tests, videotapes, and correspondence study materials.

Instructional Strategy. The combination of specific techniques, methods, and media used to achieve a particular training outcome.

Instructional Systems Personnel. Individual with expertise in all phases of the instructional systems design process, including analysis, design, development, delivery, and evaluation of training.

Instructor Presented Training. Training in which the primary method of teaching is through use of an instructor.

Job. A set of positions which are similar enough in the activities performed by workers or in the goals they serve for an organization to call the positions by the same job titles. Examples: Electronic Technician (Radar), Principal Operations Inspector (General Aviation).

Knowledge. The use of mental processes which enable a person to recall facts, identify concepts, apply rules or principles, solve problems, and think creatively. A person can demonstrate knowledge only through performing associated overt activities.

Learning Behavior. The part of an objective which describes the action to be performed.

Lesson. The smallest or most discrete unit of instruction for which objectives are developed, instructional strategies and materials are developed, and evaluation is conducted.

Lesson Plan. A plan for a lesson that provides detailed information and technical data necessary to assist the instructor in presenting the lesson material. It identifies at the appropriate points, the instructional aids and reference materials to be used in conjunction with the instruction.

Lockout Item. A step in a standard operating procedure, which if not performed strictly in accordance with the established procedure, precludes continuing with the operation of a task or subtask.

Master Reproducible. A high quality, single sided original of a document which permits reproduction of legible copies; first generation copy of a film or videotape that allows for high quality reproduction.

Media. The means through which the content of a learning experience is presented to the student; for example, transparencies, videotape, or a book.

Method. Procedure or process for imparting a training objective; for example, a performance exercise.

Module (of Instruction). Subdivision or a block of instruction that is complete within itself (i.e., "stands alone") and can be independently taught, measured, and evaluated.

Multimedia Approach. Coordinated use of more than one type of media as a vehicle for presenting the instructional objectives.

OJT Instructor Handbook. Provides the activities for both the OJT instructor and student to enable the student to complete the OJT objectives.

On-the-job Training (OJT). Method of training, usually delivered at a work site. OJT may combine several methods of instruction, including formal classroom training, reading assignments, job performance with or without supervision, self-paced instructional materials, and CBI.

Performance Exercise. Activities designed so the students can physically apply lesson information to job-like situations.

Position. Duties and tasks established as the work requirement for one individual.

Post-test. A test administered at the end of a course or block of instruction to determine the mastery level of the students. Post-tests may be written tests or performance tests.

Prerequisite. A course(s) which must be successfully completed prior to enrollment, or an approved screening examination which measures the level of knowledges and skills equivalent to that which could have been achieved in the prerequisite course(s).

Pretest. A test administered before training occurs to assess entry level skills. The pretest may be used as a baseline to measure student progress and to test out of training when the student demonstrates mastery.

Progress Test. A test given during the course to indicate individual student and class progress toward mastery of the course material. Progress tests may be written or performance tests.

Responder Item. Response item which requires using a mechanism (for example, pushing one of three buttons) to indicate the correct answer.

Response Item. Any oral or written question to which the student responds.

Skill. Physical, mental, or manipulative activity.

Standard (of Performance). A component of an objective which states the minimum level of proficiency; or how well a process must be accomplished; the acceptable quality or quantity of a product.

Subject Matter Expert (SME). Responsible for assessing the technical accuracy of the instructional materials.

Subtask. A step in the accomplishment of a task. Each subtask within a task is independent of all other subtasks. A subtask's statement starts with an action verb and includes the object of that verb.

Systematic Training Development Process. A systematic process for planning, analyzing, designing, developing, delivering, and evaluating instruction. The process ensures that personnel are trained in the knowledge and skills essential for successful job performance.

Target Population. The persons, designated in the contract, for whom instruction is developed and delivered.

Task Analysis. A systematic process for identifying, analyzing, and documenting the components of each task associated with a job. The analysis determines the characteristics, such as criticality, frequency, and difficulty of a task, and results in a hierarchy which is used to design and develop job-centered training.

Task and Skills Analysis Report. A document which contains the task analysis information by specifying the task hierarchy, sources and procedures for collecting, analyzing, and validating job information, task characteristics, and the train/no train decision for each task.

Task. A unit of work that constitutes a logical and necessary component of a duty. A duty is comprised of multiple tasks. A task is comprised of multiple subtasks, or steps.

Terminal Objective. A three-part statement, containing condition(s), behavior, and standard(s), which represents the expected behavior of a student at the end of training. Terminal objectives, also referred to as instructional objectives, support training outcomes and are, in turn, supported by enabling objectives. One or more terminal objectives are written to support each task selected for training. Terminal objectives are stated as job performance behaviors rather than training behaviors.

Traceability. A systematic process which cross-references the tasks selected for training in the task and skills analysis with the terminal objectives and training outcomes in the course design guide.

Training Outcome. A training outcome is written at the duty level of the task and skills analysis. A training outcome contains three parts: a performance, condition(s), and standard(s). Each training outcome is supported by terminal and enabling objectives.

Validation. An evaluation process which includes the developmental tryout(s), course walk-through, first course conduct, and revision to the instruction.

APPENDIX 3

ACRONYMS

APPENDIX 3

ACRONYM LIST

AHT	Office of Training and Higher Education
CAI	Computer Assisted Instruction
CBI	Computer Based Instruction
CDG	Course Design Guide
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CMI	Computer Managed Instruction
COTS	Commercial Off-the-shelf
COTR	Contracting Officer's Technical Representative
CPMIS	Consolidated Personnel Management Information System
DID	Data Item Description
FAA	Federal Aviation Administration
IAW	In Accordance With
IPR	In-Progress Review
IPT	Instructor-Presented Training
ISD	Instructional Systems Design
LLWAS	Low Level Windshear Alert System
LRU	Line Replaceable Unit
MIB	Manufacturer's Instruction Book
OJT	On-the-job Training
ORD	Operational Readiness Date
PCB	Printed Circuit Board
PDR	Preliminary Design Review

PR	Procurement Request
PWA	Printed Wiring Assembly
SME	Subject Matter Expert
TIM	Technical Interchange Meeting

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